COMPETITION LAW AND INCOME INEQUALITY: A PANEL DATA ECONOMETRIC APPROACH

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This paper investigates the relationship between competition law and income inequality using panel data techniques for a large sample of countries over the period 1960–2010. Applying our analysis to a World sample and OECD countries, we find consistent evidence of a negative, and in some specifications significant, relationship between competition law and levels of income and wage inequality. A country's level of development, its membership of geographic competition law network and the metric used to capture inequality (e.g., income or wages) appear to affect the nature and strength of the relationship between competition law and inequality. Although the results suggest that the effect of competition law on inequality is generally small, and not always significant, it does not appear immaterial when considered alongside some of the other standard tools and policies used to address inequality.

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1. Introduction

The past four decades have been prosperous. Globally, economic growth has increased by 76% per capita (USD constant) since 1980, with higher growth (86%) being achieved by the world's most industrialised countries.[1] However, over the same forty-year period, various indicators show that economic inequality levels have been increasing in many parts of the world. The latest UN Development Report records that income inequality based on the top 10 per cent's income share has risen since the 1980s, and that *"[t]he global top 1% percent, the economic elite of rich and poor countries, made huge gains over 1980–2016."*[2] So while the world, and particularly industrialised countries, has become considerably richer in aggregate, the spoils of this growth do not appear to have been distributed evenly. The gap between those with the highest income and those on the lowest income has expanded.[3]

This paper investigates whether the competition laws enacted by a country might, in some way, be contributing to the observed inequality trends. While the link between competition law and inequality has historically been given little prominence in the inequality literature, there are a number of reasons for investigating whether such a link exists. First, an overarching purpose of competition law is to limit concentrations of economic power in the hands of only a few members of society, and in so doing, indirectly reducing levels of economic inequality. In other words, competition laws are <u>not</u> generally introduced with the purpose of benefiting only the wealthiest in society. Second, as described below, observed trends in various competition-related indicators over the past four decades appear to broadly correspond with the growing inequality gap observed in some countries. Recent studies indicate that gross

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[1] GDP per capita between 1980 and 2019. See World Bank (2020).
[2] UN Human Development Report (2019). In 2017 the global top 1% owned more than 33% of total wealth while the bottom 50% owned less than 2%.
[3] In the USA, for example, between 1980 and 2017 the pretax income share of the bottom 40% in the United States fell from about 13% to 8%, while the share of the top 1% rose from about 11% to 20%. See UN Human Development Report (2019).

markups have increased in aggregate at the global level and in countries such as the USA and that this rise is connected the fall of the income share of the same period of time (Han, 2014; De Loecker and Eeckhout 2018; De Loecker, Eeckhout and Unger 2020). Third, and more generally, while the growing inequality gap is often attributed to poorly designed or skewed taxation or public expenditure policies,[4] this does not seem to provide a full explanation. Inequality measures are increasing or remaining stagnant in many parts of the world, including those with vastly different taxation and expenditure regimes. In other words, this raises a question about whether other policies, laws and instruments – including competition law – could also be contributing to the increasing inequality gap observed in many countries, and how such policies might be linked to inequality.

While there is widespread acceptance of an *a priori* relationship between effective competition law and inequality, the exact nature of the relationship between competition law and inequality remains largely unexplored empirically.[5] (Stiglitz, 2012; Furman, & Orszag, 2015; Barkai, 2016; Ennis, et al., 2017; Shapiro 2018; Lianos, 2018). Empirical studies that do exist tend to focus on inequality in specific jurisdictions (e.g., the USA or Europe) and for very specific time periods. Khan and Vaheesan (2017), for example, argue that the failure of competition law (antitrust law) in the United States to preserve competitive markets contributes to regressive wealth and income distribution, and that competition law is likely to have progressive distributive effects.

This paper seeks to build on existing work by providing a comprehensive investigation of the relationship between competition law and income inequality across a wide range of

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[4] Piketty (2001) and Piketty and Saez (2003) examine how tax return data interacts with inequality in France and the USA over time. Alvaredo et al., (2013) consider the links between tax and the top income shares across a range of countries. Other studies focussed on taxation and inequality include: Hungerford (2013) Kim and Lambert (2009), Lee and Wallace (2005).

[5] Shapiro (2018) asserts: "*antitrust enforcement does tend to reduce income inequality*". Similarly, Stiglitz (2017) notes: "*While market power has long been front and center in competition policy, recent advances have, as we have noted, provided new arguments for the importance of attacking it. It leads to inequality, and inequality leads to poorer economic performance, including lower growth and more instability*"

jurisdictions over an extended time period. At the centre of our analysis is a new legal dataset – the Competition Law Index (CLI) – that allows us to investigate the changes in competition law for 123 countries in the world over the time period from 1960 to 2010.[6] In addition to the CLI, the paper also combines other competition law indicators with various income and wage inequality proxies to explore the competition law-inequality relationship at a global level, but also in specific jurisdictions.

Our estimation strategy works in two stages. First, we use country-level panel-data to examine the relationship between the scope of competition law with various inequality indicators using the full World dataset and data from a sub-sample of developed countries. We use an OLS model and a Generalised Method of Moments (GMM) estimator to fit a linear dynamic panel-data model to investigate the relationship between (1) competition law and competition intensity, and (2) between competition law and income inequality. The system GMM model provides the required flexibility for the unobserved panel-level effects of lags of the dependent variable. The second stage of our strategy exploits variation between networks of geographical cooperation, such as the ASEAN (The Association of Southeast Asian Nations) and EU (European Union), in a linear fixed-effect OLS model. All of our models control for country fixed-effects, accounting for the time-invariant unobserved heterogeneity (by country) and the full set of time fixed effects (by year). We also account for geographical region effects[7] (other than the legal network) and an extensive set of macroeconomic time-varying factors such as the level of unemployment, economic development and human capital to investigate the relationship between competition law and income inequality.

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[6] We rely on an unbalanced panel of data, meaning that some countries, especially developing ones, might report more gaps (especially at the beginning of the time sample) in terms of observations, reducing the sample size used to perform the econometric analysis.

[7] For example, if North America, as a region, experienced a different trend over the observed period, such a trend will be absorbed by the time-trends.

We find consistent evidence of an association between the scope of competition law and income and wage inequality. However, the precise relationship between competition law and economic inequality appears to be complicated and is sensitive to factors such as the countries examined, and the inequality measure applied. Of note, we find evidence that the level of economic development can affect the relationship between competition law and inequality such that the more comprehensive competition law regimes in OECD countries appear to be associated with stronger and more significant effects. While the analysis provides evidence of a direct relationship between competition law and economic inequality, we also find convincing evidence that higher levels of trust in competition laws is associated with a higher perception of effective competition. Given the widespread presumption that more competitive markets should, other things equal, result in lower markups and hence lower prices for consumers, this provides support for an indirect link between competition law and economic inequality.

This paper comprises 9 sections. Section 2 provides a brief overview of existing research and sets out the conceptual links between competition law and economic inequality. Section 3 provides a description of the data, while section 4 provides some descriptive statistics. Our findings on the relationship between competition law and perceived competition are presented in section 5 and the main empirical findings about the link between the scope of competition law and income and wage inequality in section 6. Section 7 presents the robustness analysis and section 8 discusses the results and considers some implications of our findings. Section 9 concludes.

2. The link between competition law, competition and inequality

Conceptually, competition law and economic inequality comprise two connections, as shown in Figure 1 and empirical studies relevant to our analysis reflect the different connections in this figure. The first set of studies focus on the impact that competition law has on the intensity of competition which, as noted, are relevant because of the widely held presumption that more competitive markets should, other things equal, be associated with lower levels of inequality. A second set of studies focus on the impact that competition has on inequality. For these studies, the presumption is that competition law impacts on the intensity of competition, and therefore implying that competition law could impact on inequality. The final set of studies focus on examining the direct relationship between competition law and inequality.

Fig. 1: The figure illustrates the interconnection among competition law, competition, and inequality. Source: Authors' elaboration.

2.1 Competition law and the intensity of competition

A primary aim of competition law is to protect and enhance the competitive environment by tackling excesses of market power which can have the effect of allowing firms with market power to exploit their position to earn excessive returns (markups) and to stifle the development of competition through foreclosing entry and expansion or restrictive agreements among competitors.

One metric of the relative intensity of competition is the level of markups that can be sustained in an industry or an economy over an extended period.[8] Historically, the focus of markup studies have been on differences between prices and marginal costs in specific markets or industries, but more recent studies have exploited large aggregated datasets to explore whether economies are becoming more or less competitive. In a large cross-country study of global trends, De Loecker and Eeckhout (2018) examine 70,000 firms in 134 countries and found that average markups increased significantly in advanced economies since the 1980s.[9] Some commentators have suggested a link between the increase in markups and low levels of competition law enforcement (Berry et al., (2019) and Baker (2019). Kee and Hoekman (2007) investigate the effect of competition law adoption on the numbers of firms and the industry markups in a panel of 42 countries over 18 years. While they find evidence of an indirect effect of competition laws on domestic competition by promoting entry, they do not find a direct effect of competition laws on competition (proxied by industry markups).

Other studies use different proxies and indicators to explore the relationship between competition law and competition intensity empirically. Khan and Vaheesan (2017) examine rising industry concentration levels in the United States which they link to the failure of competition law (antitrust law) in the United States to preserve competitive markets, especially in specific industries such as communication and health care. Dutz and Vagliasindi (2000) use economic-wide enterprise mobility as a proxy for competition and find a significant positive relationship between competition law implementation and competition intensity in 18 transitional economies between 1990 and 1996. Gutiérrez and Philippon (2020) investigate

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[8] While there is obviously a need for caution in focussing too heavily on mark-ups as an indicator of competition there are systematic relationships between prices and costs in competitive markets, and for this reason we do not typically expect to find excessive returns being sustained in competitive markets, absent major innovations or specific factors that give rise to economic rents.

[9] Other studies have qualified this result, noting that such increases appear to be driven by the performance of only a relatively small group of firms particularly those in the digital sector. See IMF(2019) and Calligaris, S., Criscuolo, C., and L. Marcolin, (2018).

profit rates and find a connection between the supra-national EU competition law and increased market competition in the European Union over the past two decades.[10] More broadly, competition law and its effective enforcement have been seen as crucial in protecting competition and enhancing consumer welfare in literature surveys and meta-analysis (OECD reports 2013a, 2014, 2016). However, the limitations of some of these studies lie in their case-by-case outcome, with results being limited to specific sectors or country-specific competition law reforms.

2.2   *The intensity of competition and income and wage inequality*

The empirical relationship between the intensity of competition (or the extent of market power) and the degree of inequality was first investigated by Comanor and Smiley (1975). They found that up to one-half of wealth holdings by the richest 2.4% of American households at the time, was entirely due to capitalised monopoly gains. Creedy and Dixon (1998) use Australian data to estimate the relative burden of monopoly for different household income levels for 14 commodity groups (including food, beverages, and housing costs) and found that the welfare loss is 46 per cent higher for the lowest decile compared to the highest. Hausman and Leibtag (2007) estimate an average 4.8 per cent reduction in prices associated with greater retail competition (low-priced outlets) in the USA and found that households with income below USD 10,000 benefitted disproportionately from competition (by approximately 50% more than the average household). Han (2014) uses a panel of 22 countries (18 developed) from 1961-2004 and finds a positive effect of market power on the top 5%, 1%, and 0.1% income share and the opposite effect on the low 10% and 5% income shares. More recently, Ennis and Kim (2017) investigate this relationship in seven countries and found that about one-tenth to one-quarter of the wealth accumulated by the top 10 income percentile (richest) comes from market

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[10] Although the empirical analysis only focusses on product market regulations (PMR) as their main proxy for policy changes the authors specifically tie competition law regulation as a main driver for the change.

power.[11] Gans et al. (2018) focus on the effects of capital shareholding versus consumption in the United States, exploring the conditions under which market power can transfer wealth from consumers to shareholders, and what impact these mechanisms have on income inequality. The main result is that by increasing producer surplus and decreasing consumer surplus, monopoly power effectively acts to transfer resources from low-income families to high-income families. Other studies have focussed on the impact of increased market power on wages, particularly those of low-skilled workers. De Loecker and Eeckhout (2017, 2018) link to the rise of markups in the USA and globally to the decline of both the labour and capital shares, as well as the reduction in low-skilled wages. They find that increased capital and labour income dispersions between earners at different levels of the overall income distribution are concentrating wealth at the very top. Bergholt et al. (2019) suggest that markups (as a proxy for market power) have significant explanatory power for the decline of labour share, and attribute the decline in labour share to a firm's market power and automation (increasing use of automatic manufacturing systems) in the last 20 years.

2.3   The relationship between competition law and inequality

Most relevant to the current investigation are studies that have sought to directly investigate the relationship between competition law and inequality. As far as we are aware, Dierx et al. (2017), present the only empirical study on the relation between competition policy and distributional macroeconomic effects. Using a mixed 'bottom-up' approach, the authors develop a model that connects competition policy, competition, and wealth distribution and

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[11] The theoretical links between market power on distribution are described by Ennis and Kim (2017) in the following way: "*The existence of corporate market power has a dual effect, not only generating profits for companies that are above the competitive rate of return, but also imposing higher prices on consumers. The increased margins charged to customers as a result of market power will disproportionately harm the poor, who will pay more for goods without receiving a counterbalancing share of increased profits. The wealthy, while also paying more, will at the same time receive higher profits from market power, because of their generally higher ownership of the stream of corporate profits and capital gains. These market power gains are assumed to be distributed in proportion to current total business ownership claims*",

therefore takes account of the three-part causal chain.[12] The authors investigate the effects of EU competition policy interventions on distributional outcomes across households with different skill levels and across different types of income earners (capital owners, wage earners, and benefit recipients). They find that liquidity-constrained households (i.e.: less well-off individuals) increase their consumption proportionally more than non-liquidity-constrained households (four times more after five years), supporting the notion that competition law enforcement could have a strong progressive effect.

3.   Data description and estimation strategy

This section discusses the data and estimation strategy that underpins our empirical analysis. It first describes the three different competition law indicators we use before discussing the various measures of economic inequality and the control variables we have used to isolate the effect of competition law on inequality. It also provides an overview of our estimation strategy.

3.1   Competition law indices

Various competition law 'indexes' have been developed which can be used to capture the goals and scope of competition laws in different jurisdictions, including how they changed over time. Our analysis uses the two most comprehensive competition law indices available which allow for the use of panel data econometrics: the Competition Law Index (CLI) and the World Economic Forum Global Competitiveness Index (GCI). In our descriptive analysis we include

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[12] Consumer's savings estimates are calculated by multiplying the foreseen reduction in prices (in comparison with the counterfactual of no competition policy intervention) and duration of such price reduction and the turnover in the market affected by the decision.

a third index (the Competition Policy Index, CPI) that measures changes in the components of competition law over time, but is limited in scope (120 observations only). [13]

The CLI prepared by Bradford & Chilton (2018) is the most comprehensive and current index of the scope of competition laws available and includes almost all countries in the world (123 out of 126) that enacted competition laws between 1889-2010. As such, a unique aspect of the CLI is that it allows for cross-country time-series research on competition laws (i.e., panel data). The CLI database includes aggregated dummy variables that capture the key elements of competition regulation: merger control; abuse of dominance; horizontal agreements; authority powers; and substance law (which refers to the aggregation of the three sub-categories of rules). Each element is based on a set of dummies (0/1) variables and aggregated into a 0-1 scale of the norm. The five elements are furthered aggregated to an overall CLI index 0-1 (0=worst; 1= best), that measures the scope of competition regulation (the net regulation or risk associated with it).

The GCI is also global in scope and contains data for 152 countries over a decade (2007-2017) covering a broad set of indicators dealing with institutions, infrastructure, ICT adoption, macroeconomic stability, health, skills, product markets, labour markets, financial system, market size, business dynamism and innovation capability. For the purpose of our analysis, we use three indicators. The first two indicators are the (perceived) 'intensity of local competition' which is a survey proxy for competition (traditional concentration levels (HHI) or markups or profit margins) and the 'extent of market dominance' which captures the degree to which dominant providers are perceived to distort competition in markets. The leading competition

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[13] Other competition law indices include: Nicholson's (2008) Antitrust Law Index which classifies competition law regimes according to three headings: (i) *Regime Structure* (scope, structure, and available remedies); (ii) *Merger Policy* (notification, assessment criteria, and rights of private enforcement); and (iii) *Anti-competitive Practices* (dominance and restrictive trade practices); and Voigt (2009) provides another competition law index based on four indicators: (i) the substantive content of competition laws; (ii) the degree to which they incorporate an economic approach; (iii) the formal independence of the competition agencies that are to implement the competition laws, and (iv) the actual independence of the competition agencies.

law indicator we use is the effectiveness of 'anti-monopoly policy' which ranges from 1 to 7, indicating the worst and the best score respectively. Like the CLI, the GCI allows for cross-country time-series research on competition laws (i.e., panel data), albeit on a more limited time horizon. The extent of overlap between the two indicators is minimal (2007-2010) and coincided with the financial crisis, which limits the comparability of the two indexes. The GCI also allows us to examine the relationship between competition law and perceived levels of competition intensity in local markets. This data is limited by the method of collection (survey), but allows for a closer look at how trust in competition law and the perceived competition in markets interact.

A third index, known as the Competition Policy Index (CPI), was compiled by Buccirossi et al. (2011) as a measure of the quality of competition policy. The index is based on data for 12 developed countries over the time span 1995-2005.[14] The CPI is an aggregated index of a sub-set of indices which are calculated covering two main areas of study: competition law infringements (including hard-core cartels, anti-competitive agreements and abuse of dominance) and merger control policy (the number of mergers investigated in each year). The aggregate CPI index is constructed using a 'pyramidal' approach from 'low level' indicators, through 'medium level' sub-indices, to 'high level' indices.[15] While the CPI differs from the CLI and GCI in its scope and coverage, it is useful in examining how changes in the quality of competition law in OECD countries might impact on inequality.

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[14] Canada, Czech Republic, France, Germany, Hungary, Italy, Japan, Netherlands, Spain, Sweden, United Kingdom, United States.

[15] The aggregate CPI is calculated by combining the four high-level indices which are: antitrust CPI; mergers CPI; institutional CPI; enforcement CPI. The resultant CPI aggregate measure includes, among others, the investigative powers of the competition authority, the level of the overall loss that can be imposed on firms and their employees, and the toughness of a competition authority (i.e.: the level of activity of a competition authority.

3.2   Economic inequality indicators

For the purpose of our analysis, we implement different and complementary income and wage inequality proxies: the gross Gini, the net Gini index and the EHII index (Estimated Household Income Inequality), respectively taken from the SWIID (Standardized World Income Inequality Database)[16] and from the UTIP-UNIDO (University of Texas Inequality Project – United Nations Industrial Development Organization). While the Gini indices span the period between 1960 and 2019, the EHII covers a slightly shorter period, between 1963 and 2015. We originally included in our specifications the top and the bottom income shares as alternative, dependent variables (respectively taken from the World Inequality Dataset and the World Development Indicators) with the aim of examining the extreme tails of the income distribution. However, because of the paucity of data (both in terms of time span and cross-country coverage), we decided to focus only the Gini and the EHII index as our main dependent variables.

The decision to implement both Gini indicators (net Gini and gross Gini) is crucial as they can differ due to the different redistribution policies across countries. The indicators range between 0 (perfect equality in income distribution) to 1 (perfect inequality). The EHII proxy ranges from 0 (perfect equality) to 100 (perfect inequality). It is based on individual wage income, developed by the University of Texas inequality project (UTIP 2008). It is calculated by first regressing the Deininger and Squire (DS) Gini index on the UTIP-UNIDO Theil pay inequality index (which measures the dispersion of wages within the manufacturing sector, as an indicator of sector specialisation) and other control variables (such as the manufacturing

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[16] The source of the Gini indices, the SWIID dataset, "*represents a particular choice in the balance between comparability and coverage: it maximizes comparability for the broadest available set of country-year observations*" Solt (2009).

employment share and other dummies related to data structure).[17] Predicted values are then used to construct the EHII indicator.[18] Since the EHII index is a wage-based measure, it does not include income from self-employment nor from the agricultural sector. However, given its form of construction, this measure is more stable over time. It does not include capital income and other sources of financial gains which depend to a large extent from the fluctuations of the stock markets (such as stock options realisations, wage or salary payout as a direct result of investments in venture capital). In addition, it is calculated by taking account of information on individuals and not at the household level (or using mixed data), making it more consistent.

In addition to looking at income and wage inequality, we also sought to investigate the relationship between competition law and wealth inequality using data from the WID (World Inequality Dataset) on top wealth shares. Unfortunately, data were available only for few countries in the sample (mostly developed economies) and for a limited period. As a second-best solution, when then tried to use data on the 'wealth-income ratio' which provided better coverage in terms of years and countries to include in the sample, but came at the cost of being an imperfect proxy for wealth inequality. Given the potential risks of misattribution associated with using an unreliable proxy, we ultimately decided to focus on income inequality measures only.

3.3   Control variables

We include various controls typically associated with inequality.[19] The main source for these variables is the WDI (World Development Indicator) from the World Bank. We include GDP

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[17] We decided not to use, as an alternative income inequality measure, the Gini index from the Deininger and Squire dataset (DS), given some inconsistencies and the lack of comparability of the information provided by this dataset. This is mainly due to the practice of mixing together different types of data, such as gross and net income, individual and household level, expenditure and income.

[18] Data based on average income of representative groups of people (such as industry, sector or even region) "*may also contain a sufficiently large share of information on the evolution of inequality, so as to serve as good instruments for the movement of the distribution as a whole*" (Galbraith, 2009).

[19] Barro, (2008); Delis et al., (2014); Causa et al., (2015); Jauch, S., & Watzka, S. (2016).

per capita (*log_GDP_pc*) to capture the level of economic development of a country and the inflation rate (*log_inflat*) to control for macroeconomic stability and monetary policy.[20] The total unemployment rate is also included, as increases in unemployment have been found to disproportionately affect low-income groups (Van Arnum and Naples, 2013) and raise inequality as more workers shift to the bottom of the income distribution. The level of imports (*log_imp*) and exports (*log_exp*) as (% GDP) are included separately (Cuaresma and Roser, 2016) to test for the Stolper-Samuelson theorem.[21] Public expenditure (*log_gov*) can be very effective in reducing inequality, if efficiently allocated, by improving the living conditions of the bottom income earners through redistributive policies; on the other hand, if the public resources are not wisely employed, inequality might increase. We also include the life expectancy (*log_life_exp*) as a proxy for human capital and is positively correlated with education.[22] Finally, the gross capital formation or physical investment (*log_inv*) is added as a control to capture differences in how the rate of returns of human and physical capital interact with inequality over time.[23]

Table 1: Overview of the variables[24]

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[20] The effect of inflation on inequality is ambiguous (Coibion et al., 2017; Furceri et al., 2018). Inflation can be costly and harmful for the poor which hold more illiquid assets. When prices increase, the real value of wages and cash decrease, while the value of financial assets (mostly held by the wealthy groups) increase, making the rich better insured and protected against uncertainty. However, lower interest rates can benefit borrowers (middle-class households with fixed-rate mortgage debt) to the detriment of savers (Doepke and Schneider, 2006).

[21] In brief, this predicts that trade liberalization will increase the relative prices of the labour (capital) intensive goods, consequently making labour income workers better-off (worse-off) and capital income earners worse-off (better off).

[22] We acknowledge that education would have been a better proxy for human capital and that it plays a crucial role in shaping inequality (Coady, D., & Dizioli, A., 2018). However, the limited amount of data and the presence of several missing values would have considerably reduced the size of our sample. As an alternative the life expectancy proxy is highly correlated to the education measure ($\rho=0.85$) and there is sufficient data for the required time periods of our analysis.

[23] This builds on Galor, O., & Moav, O. (2004) who explains how physical and human capital accumulation may be linked to income inequality. In the initial phase of industrialization, physical capital tends to be the main booster of economic growth (and ensuring a higher rate of return), widening the level of income inequality as the poor have a lower marginal propensity to save. However, as the economy develops, the rate of return of human capital increases (due to capital-skill complementarities), making human capital accumulation the main engine of growth. As investment in human capital gradually increases, wages increase, making credit constraints less binding for the poor.

[24] The *inflation* proxy presents high values in absolute terms with respect to the min and max. We decided to report them in the table because they are not the result of a measurement error. Indeed, the maximum value of the

Variable	Source	Obs	Mean	Std.Dev.	Min	Max
gini_disp	SWIID	5202	0.383	0.086	0.175	0.665
gini_mkt	SWIID	5202	0.455	0.063	0.217	0.705
Ehii	UTIP-UNIDO	4559	42.509	7.358	20.578	62.85
cli_overall_norm	Bradford & Chilton (2018)	8198	0.198	0.292	0	1
anti_monopoly	World Economic Forum	1473	3.982	0.786	2.022	6.123
gdp_pc	WDI	4927	13765.49	17276.67	285.586	141000
gov_exp	WDI	7319	16.009	7.919	0	147.733
life_exp	WDI	10525	63.73	11.415	18.907	85.417
Inv	WDI	7326	23.305	8.661	0.293	95.32
inflat	WDI	7246	19.296	156.088	-60.496	7481.66
Unemployment	WDI	4728	7.871	6.144	0.14	37.976
imp_gdp	WDI	7813	41.074	26.363	0.016	236.391
exp_gdp	WDI	7813	35.086	26.285	0.005	228.994

Notes: The table reports the descriptive statistics for the time span 1960-2017, except for the *cli_overall_norm*, whose observations are only available up to 2010.

3.4 Econometric estimation

Our first econometric estimation strategy is based on an OLS model with two different specifications to account for year and country fixed effects (specification I) and regional time trends (specification II). By including country and time fixed effects we seek to control for the time-invariant unobservable heterogeneity across the economies (such as their preferences towards inequality aversion, their historical and legal background, their political system and cultural factors) and the common macroeconomic shocks and potential global trends (such as global financial shocks). The interaction between geographical regions (according to the World Bank categorisation) and years captures region-time variant factors, taking account of the different effect of time (and shocks) among macro geographic regions. We also estimate robust standard errors and cluster them at country level to correct for heteroskedasticity and correlation in the error terms. We estimate the model in logs, to better control for outliers and

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inflation refers to the hyperinflation experienced by Peru in early 1990s and the minimum value describes the deflation which took place in Angola around 2010. However, in the econometric analysis, since we take the logarithmic transformation, negative values (that account for roughly 3% of the total sample) are automatically dropped out of the sample and the few outliers present in the sample are rescaled. The minimum value of 0 of the *gov_exp* refers to Mali, over the period 1980-1984 (low level of public expenditure are mainly found in low developed countries, for which controls are also missing especially at the beginning of the time sample). The *cli_overall_norm* ranges from 0 to 1 and, similarly, when we run the model in log, its minimum values are not kept in the sample. In doing this, we decided to assume a conservative approach, by keeping those countries which had already a competition law in place. In fact, we did not want our results to capture the shift in the adoption of the antitrust law, which would have affected the main purpose and the implications of our analysis.

to ease the interpretation of results in terms of elasticities. The econometric specifications with respect to the 'inequality-competition law' relationship are as follows:

Specification I

$$Y_{i,t} = \beta_o + \beta_1 CLI_{j_1,t} + \sum X_{i,t} + \alpha_i + \gamma_t + \varepsilon_{i,t} \tag{1}$$

Specification II

$$Y_{i,t} = \beta_o + \beta_1 CLI_{j_1,t} + \sum X_{i,t} + \alpha_i + \gamma_t + \delta_{j_2} * \gamma_t + \varepsilon_{i,t} \tag{2}$$

Where i defines the countries, j the region (the subscript j_1 refers to the network cooperation regions, while j_2 defines the geographical regions categorised by the World Bank) and t the years; $Y_{i,t}$ is the inequality measure (Gini or the EHII index). Specification I uses both country-level competition law scope $CLI_{i,t}$ and the $CLI_{j,t}$, which represents the Competition Law Index aggregated at regional cooperation level (WAEMU; ASEAN; CARICOM; COMESA; EAC; ECOWWAS; EFTA and EU). $\sum X_{i,t}$ are the control variables considered to be the co-founders of income inequality (imports, exports, life expectancy, investment, level of economic development, unemployment and inflation); α_i refers to the country fixed effect; γ_t captures the time fixed effect; $\delta_j * \gamma_t$ measures the regional time trend term; $\varepsilon_{i,t}$ is the error term.

These specifications were also used to model the 'competition intensity - competition law' relationship, with some slight differences including a more limited set of controls which, in principle, might affect the competitive environment (inflation, unemployment rate, imports, exports, government expenditure, education and the GDP per capita). We also use a different proxy for the competition law, namely the 'anti-monopoly norm' index (a measure of perceived

competition law) taken from the GCI (Global Competition Index).[25] The reason why we had to implement an alternative competition law index is due to a mismatch in term of the time span.[26]

$$\text{Competition\_intensity}_{i,t} = \beta_0 + \beta_1 GCI_{i,t} + \sum X_{i,t} + \alpha_i + \gamma_t + \varepsilon_{i,t} \tag{3}$$

Our second set of econometric estimations seek to address possible endogeneity and the dynamic nature of inequality data. Given the absence of a valid external instrument,[27] we implement the System GMM to try to account for an element of 'persistence' in inequality data. The System GMM estimator (Blundell et al., 2001) fits linear dynamic panel-data models where the unobserved panel-level effects are correlated with the lags of the dependent variable. This estimator is designed for datasets with many panels (N) and a few periods (T). The assumptions that justify the implementation of this estimator are several: we suspect that the process is dynamic, with current values of the dependent variables (inequality) being influenced by its own past realisation (element of 'persistence'); the presence of individual fixed effect; the presence of potential endogenous variables or some predetermined variables not being strictly exogenous (they are independent on current errors but they might be influenced by past disturbances). We opt for the system GMM estimator given its superior properties compared to the difference GMM estimator (Arellano and Bond, 1991) in terms of efficiency and also performance in the presence of weak instruments (Bun and Windemeijer, 2010).

4.   Descriptive statistics

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[25] We did not run regression (3) by averaging the anti-monopoly norm at the regional organization level as this competition policy index comes from practitioners' surveys and as such is a reflection of subjective and cultural beliefs.

[26] Specifically, while data for the CLI are available up to 2010, the data for the perceived competition only spans from 2007 to 2017.

[27] We initially run the IV 2SLS stage least square model using as an instrument the data of Klerman et al., (2011) which combines legal origin (French, German, Mixed, Scandinavian, Common, Islamic) and colonial power (Austro-Hungarian, British, French, not-colonized, Others, other French civil law). However, the Kleibergen-Paap F stat suggested that these instruments were of little relevance for our model.

Figures 2 to 10 show the changes in the underlying competition law indices over time. They provide insight into three points: how each aggregate competition law index has changed over time; how changes in the competition law index vary across countries and regions at different stages over development; and finally, how the competition law index has changed within a given country or region.

Figure 2 shows that the CLI exhibits a positive trend since the early 1980s, suggesting that the scope of competition law has generally increased over the past four decades in many countries. However, the CLI shows significant variation between regions and countries. Some regions like North America have a significant gap on the rest of the world, while other regions, especially Africa, the flat line of no competition policy remains until the 1990s. Within-country, the CLI exhibits only a small variation over time in some jurisdictions.[28] Given the long-time span of the data, this allows for a broader look at the link between competition law and economic inequality. Figure 3 shows the differences in the CLI recorded for low income and high-income countries since the 1980s. It shows a more rapid rise of the CLI for the two middle-income groups since the mid-1980s compared to high-income countries. To further investigate this gap, figure 4 plots the CLI score over time, separating OECD vs non-OECD countries. The two panels of figure 4 are almost a continuous trend of development when the end of non-OECD countries touching upon the OECD panel of the right, suggesting that as countries become more developed the scope of their competition law also expands. The non-OECD countries only started to expand the scope of their competition law regimes in the late 1990s.

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[28] For example, in the USA, the CLI shows an increase in the overall score but no variation in its abuse of dominance (antimonopoly) norm elements. So, it seems to reflect an upward trend, in a way that departs from the conventional legal interpretation of competition enforcement. In that respect, it is important to emphasise that the CLI measures the *scope* of the law, and therefore ignores enforcement trends, such as an increase in cartel enforcement or decrease in merger scrutiny. In a similar way, it does not reflect de-facto powers of enforcement authorities, budgets, staff and independence.
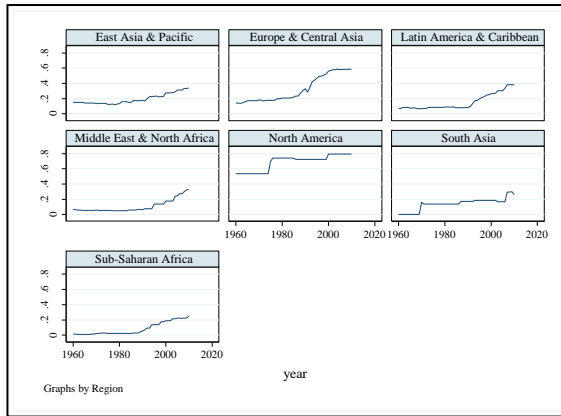
Fig.2 : CLI average by region
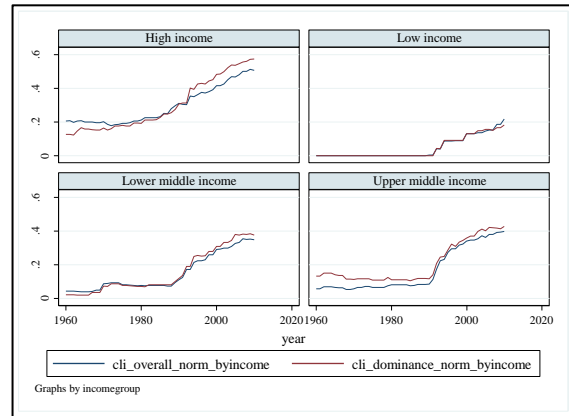
Fig.3 : *CLI average by income-group*
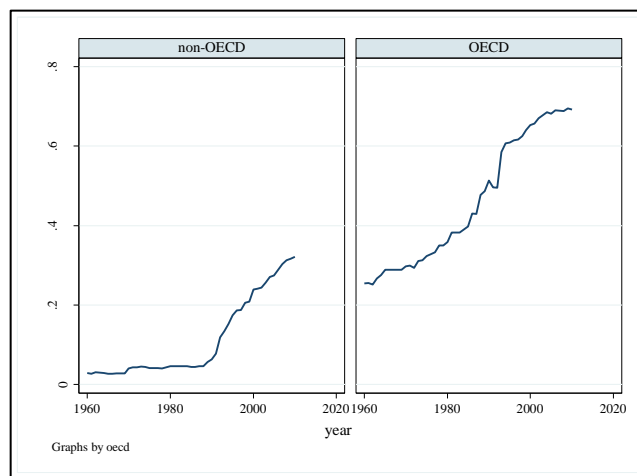
Fig. 4: CLI Non-OECD vs OECD

Figure 5 shows the changes in the three GCI indexes (competition intensity, the effectiveness of anti-monopoly and extent of market dominance) over the period 2007-2017. While the aggregate trend for the effectiveness of market dominance has been relatively stable, the other two proxies exhibit a more volatile pattern. Figures 6 and 7 report the same statistics but disaggregated by income groups and regions with the same categorisations as above. The high-income group shows a slightly decreasing trend in the effectiveness of the anti-monopoly policy, as shown in Fig. 6, possibly reflecting a decreasing trust in the regulation and markets. The rest of the income groups displays a similar non-linear pattern over time, with increasing level of anti-monopoly policy score being followed by a rather sharp decrease, around 2014.
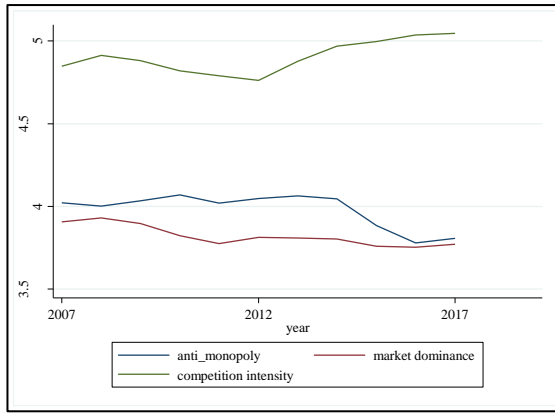
Fig.5 : GCI average over time
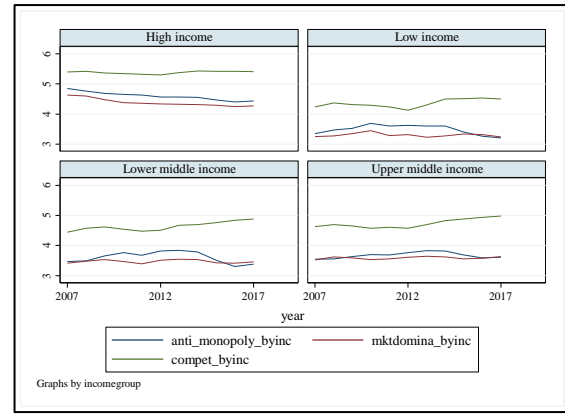
Fig.6: GCI average by income-group
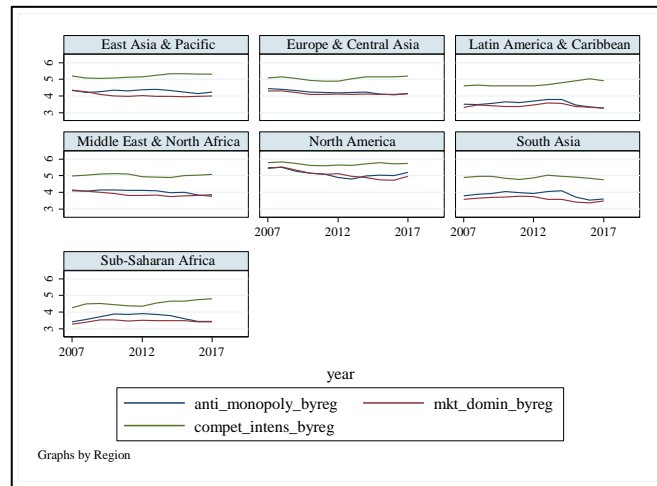
Fig.7: GCI average by region

Finally, figure 8 shows the change in the Competition Policy Index (CPI) over time, which is consistent with some of the indices (notably the OECD CLI in figure 5). It exhibits an upward trend from about the year 2000 at the aggregate level. Figure 9 shows the changes in the CPI by country. It reveals significant variation in the CPI; some countries record flat CPI values (such as Italy, Japan, Germany, US, Canada). In contrast, others (such as the UK, Netherlands and Czech Republic) depict a more volatile and upward trend over time. All the countries are part of the high-income group.
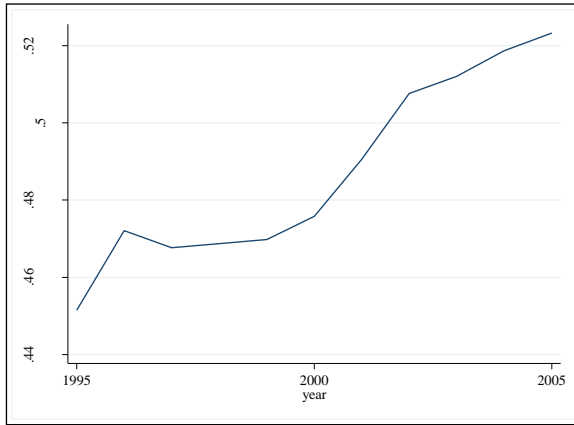
Fig. 8: CPI average change over time
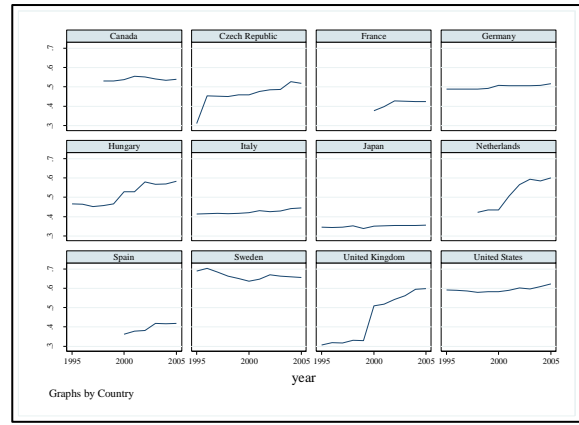
Fig. 9: CPI changes by country

4.2   Changes in the competition law indices as compared to the GINI

The left panel of figures 10 to 12 plot each of the three competition law indices against the Gini disposable income (gini_disp). All three figures show a negative association between the relevant competition law indicator and the Gini indicator, suggesting that more comprehensive competition laws could be associated with reductions in the level of income inequality. However, the scatter plot is potentially misleading given the heterogeneity in the data which is exposed once we account for the income group of a country and its level of economic development as shown in the right panels. The CPI, which includes data on 12 developed countries, is an exception, yet country-level differences could still lead to spurious correlation. It is also important to remember that each index measures different aspects of competition law and over different periods. The GCI is survey data, providing an indication of perceptions and trust. The CLI is limited to the "Law of the Books", and the CPI provides limited coverage in time and countries. Yet, this descriptive analysis provides a clear motivation to study this relationship using more advanced econometric tools.
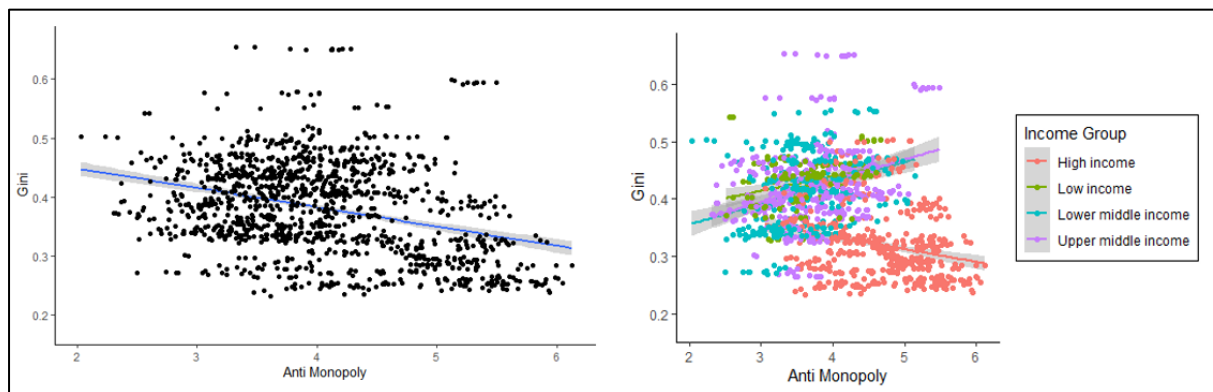
Fig. 10: GCI Effectiveness of anti-monopoly policy and The Gini disposable income.

22
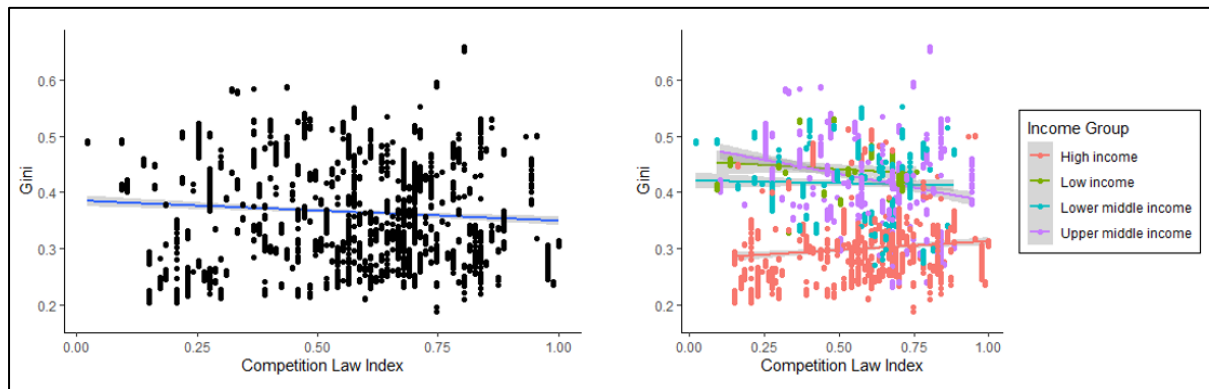
Fig. 11: CLI and The Gini disposable income
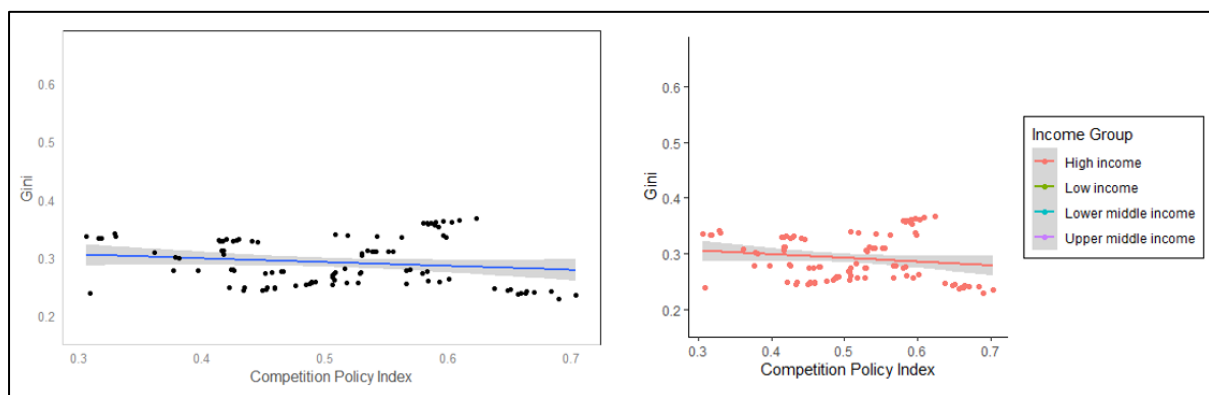
Fig. 12: CPI and The Gini disposable income.

Our initial aim was to use all three competition law indices to shed light on the complex interaction between competition law and income/wage inequality. However, because of the different time span and geographical coverage, we ultimately decided to base our econometric analysis only on the CLI (to address the 'inequality-competition law' relationship) and on the GCI (for the link' competition intensity-competition law'). While the CPI provides useful data on the competition law enforcement, it covers only a limited sample of developed economies for only a decade. This limits the ability to undertake an in-depth analysis across countries at different stages of development, nor does it allow for an examination of how the relationship has changed over time.[29]

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[29] The time span 1995-2005 for the CPI does not overlap with the 2007-2017 time range for which we have data on competition intensity.

5. **The effect of competition law on perceived competition intensity**

Before examining the relationship between the competition law indicators and inequality, we consider it useful to investigate the prior question of whether there is any evidence that there is a relationship between competition law and more intense competition. The theoretical foundation for the hypothesis that competition law could affect economic inequality depends on the law's effect on competition. Put another way, any effect the law may have on economic inequality is a result of its effect on competition intensity as depicted in figure 1. On this reasoning, if there is evidence that competition law has increased the intensity of competition, then other things equal, it might be assumed that it is affecting reducing inequality, and vice versa.

Figure 13 depicts the scatterplots between the (perceived) competition intensity proxy and the GCI anti-monopoly indicator. Both graphs suggest the presence of a positive relationship between the (perceived) competition intensity and anti-monopoly regulation as perceived in the expert survey of the World Economic Forum.
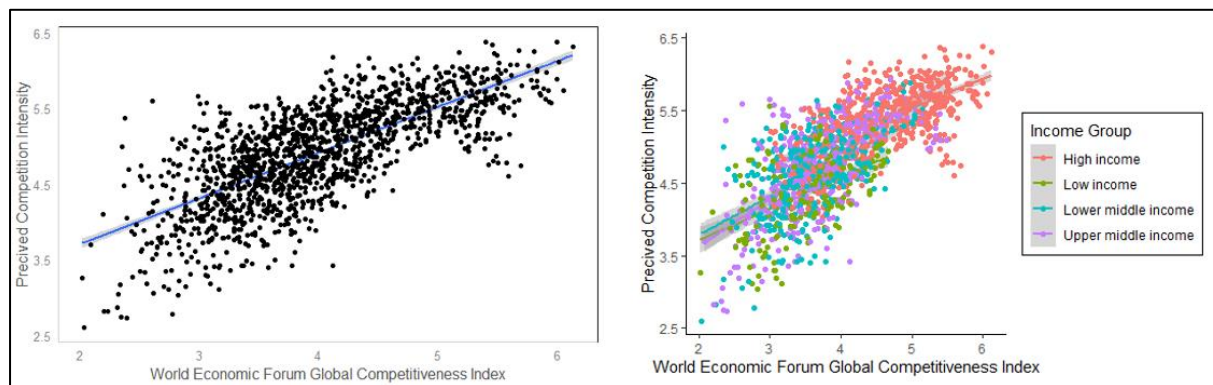
Fig. 13: GCI competition intensity and the anti-monopoly proxy

This relationship between competition intensity and more effective anti-monopoly laws is confirmed by OLS regressions. We apply model estimation (3) using the two specifications, and a log-log transformation, including the relevant controls, discussed in Section 3.

Table 2: log-log, GCI perceived competition and trust in competition law

	(1)	(2)
	log_compet_intens	log_compet_intens
log_anti_monopoly	0.244***	0.244***
	(0.056)	(0.054)
log_schoolsecond	-0.008	-0.052
	(0.047)	(0.044)
log_inflat	0.004	0.001
	(0.003)	(0.004)
log_unempl	0.018	0.023
	(0.014)	(0.017)
log_exp	-0.021	-0.019
	(0.027)	(0.027)
log_imp	0.036	0.072**
	(0.037)	(0.036)
log_gdp_pc	0.073*	0.087*
	(0.040)	(0.051)
_cons	0.326	0.246
	(0.473)	(0.583)
Obs.	994	994
R-squared	0.878	0.897
Country & Year FE	YES	YES
Regional Time Trends	No	YES

Robust standard errors are in parenthesis   *** p<0.01,
** p<0.05, * p<0.1

Table 2 finds a positive and significant coefficient when we run the model using GCI competition indicator against the GCI anti-monopoly indicator as our competition policy proxy. This result is robust in on sub-samples of the data, including for both developed (OECD) and non-OECD countries, including all each of the controls separately. Table 3 presents the sub-sample results.

Table 3: log-log, perceived competition and trust in competition law, sub-samples

	(1) Non-OECD log_compet_intens	(2) OECD log_compet_intens	(3) Non-OECD log_compet_intens	(4) OECD log_compet_intens
log_anti_monopoly	0.245***	0.413***	0.234***	0.307***
	(0.066)	(0.096)	(0.060)	(0.082)
log_schoolsecond	-0.009	-0.112	-0.023	-0.094
	(0.045)	(0.087)	(0.047)	(0.083)
log_inflat	-0.000	0.009*	-0.002	0.004
	(0.004)	(0.005)	(0.005)	(0.005)
log_unempl	0.006	0.016	0.015	0.008
	(0.013)	(0.032)	(0.020)	(0.037)
log_exp	-0.018	0.081	-0.042	0.117
	(0.029)	(0.087)	(0.026)	(0.070)
log_imp	0.062*	-0.052	0.092**	-0.052
	(0.035)	(0.084)	(0.038)	(0.078)
log_gdp_pc	0.063	0.129*	0.040	0.147
	(0.045)	(0.074)	(0.053)	(0.095)
_cons	0.336	0.213	0.561	-0.018

	(0.525)	(0.907)	(0.625)	(1.255)
Obs.	660	334	660	334
R-squared	0.858	0.787	0.883	0.835
Country & Year FE	YES	YES	YES	YES
Regional Time Trends	NO	NO	YES	YES

<div align="center">Robust standard errors are in parenthesis   *** p<0.01, ** p<0.05, * p<0.1</div>

Taken together, these regressions suggest a positive and statistically significant strong correlation between more effective competition laws and more intense competition. As noted above, given the presumption of a link between more intense competition and reductions in inequality, this allows for a conjecture that there may also be an association between effective competition laws, more intense competition and reduced inequality.

Because of the lack of valid external instruments, we decided to run the system GMM model (which relies on internal instruments) to assess the link between 'competition intensity-competition law' and address possible endogeneity for both the World and OECD samples. The system GMM, unlike the diff-GMM, also includes a set of lagged first-differences to instrument the equations in levels. This estimator is well designed for datasets with many country panels (N) and few periods (T).[30] Hence, as a standard post-estimation test, we run the Arellano-Bond test to detect the presence of first-order serial correlation in level by testing for serial correlation of II order in differenced residuals.[31] Under the null there is no autocorrelation of II order and the model's dynamics is well specified. We also test for the goodness of the internal instruments, by running the Hansen test - under the null of joint validity of the instruments - and we do not reject it, with a p-value equal to 0.21 and 0.65 (respectively for the World and OECD sample).[32] Results are reported in Table 4. The optimal estimated dynamics points at four lags, with both the Hansen and the Arellano-Bond test, perform well, suggesting the presence of the element of persistence in the competition intensity (which translate into an autocorrelation between the dependent variable and its lags). The reason of this might be due to the slow-changing competitive environment, which could also be explained by the presence

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[30] In this case T=10 and T<<N. As Baum (2013) observes: "*By construction, the residuals of the differenced equation should possess serial correlation, but if the assumption of serial independence in the original errors is warranted, the differenced residuals should not exhibit significant AR(2) behavior*".

[31] '*In general, we check for serial correlation of order l in levels by looking for correlation of order l+1 in differences.*' (Roodman, 2006, p. 34)

[32] This test becomes weaker, the less parsimonious is the model and the more instruments are included, especially in finite samples models, which may lack the amount of information for the estimation of the large variance matrix of moments (which is quadratic in the n. of instruments). Despite the coefficient estimates remain robust they are weakened by many internal instruments. We also acknowledge the claim by Roodman (2006, p.12) that "*the Sargan/Hansen test should not be relied upon too faithfully, as it is prone to weakness*" and even too good p-values (close to 1) might be the proof of the proliferation of many instruments (even though there is no consensus on this point, nor one commonly accepted rule of thumb).

of some persistent distortions in the market, such as high market power shares, 'too much' concentration, few dominant companies and low rates of entry or expansion in a market.

Table 4: GMM, perceived competition and trust in competition law, sub-samples

	(1)	(2)
	log_compet_ intens	log_compet _intens
L.log_comp_intens	0.512***	0.760***
	(0.193)	(0.120)
L2. log_comp_intens	-0.550***	-0.479***
	(0.094)	(0.092)
L3. log_comp_intens	0.226**	0.332***
	(0.092)	(0.066)
L4. log_comp_intens	-0.139*	-0.136**
	(0.076)	(0.060)
log_anti_mono~y	0.092**	0.201**
	(0.043)	(0.081)
log_schoolsec~d	0.030	-0.065
	(0.051)	(0.070)
log_unempl	0.020	-0.018
	(0.030)	(0.020)
log_gdp_pc	0.039	0.039
	(0.024)	(0.053)
log_exp	-0.007	-0.106
	(0.054)	(0.067)
log_imp	0.095**	0.089
	(0.044)	(0.070)
log_inflat	-0.002	0.001
	(0.003)	(0.003)
log_gov_exp	-0.036	-0.147
	(0.047)	(0.094)
_cons	0.601*	0.996*
	(0.330)	(0.580)
Obs.	580	210
Sample	World	OECD
Time FE	YES	YES
N. instruments	55	55
Autocorrelation II order	0.60	0.10

Robust standard errors are in parenthesis   *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The narrow overlap between the GCI and CLI (3 years), does not allow us to adequately test the relationship between the CLI and perceived competition. However, we present more sensitivity tests for the GCI analysis in section 7.

6. Results: Competition law scope and income and wage inequality

This section presents the results of the analysis of the relationship between the CLI index and the GINI inequality or ehii wage inequality measures. [33]

6.1 The relationship between country-level competition law and income and wage inequality

Table 5 presents the results for the entire World CLI dataset with a full set of controls. The country-level scope of the law is the best proxy in our dataset to test the relationship between competition law and income and wage inequality. We follow the estimation equations 1 and 2 (1 – column 1 to 3, 2 - column 4-6). In the log-log panel model, we assume units are exposed to parallel trends (like in any difference-in-difference model). To make this assumption more reliable, after running the model on the full World dataset (Table 5) we limit our estimations to OECD countries (Table 6).[34]

Table 5: log-log, CLI and income inequality, World data

	(1) log_gini_mkt	(2) log_gini_disp	(3) log_ehii	(4) log_gini_mkt	(5) log_gini_disp	(6) log_ehii
log_cli_overa~m	-0.007	-0.006	-0.007	0.001	0.001	-0.038*
	(0.006)	(0.008)	(0.017)	(0.008)	(0.010)	(0.020)
log_lifeexp	-0.173*	-0.121	0.089	-0.233**	-0.232*	0.256
	(0.098)	(0.111)	(0.214)	(0.101)	(0.135)	(0.338)
log_gdp_pc	0.050**	0.057*	-0.054	0.023	0.035	-0.082
	(0.024)	(0.032)	(0.046)	(0.026)	(0.033)	(0.054)
log_exp	-0.010	-0.018	0.061**	0.006	0.000	0.054**
	(0.015)	(0.016)	(0.027)	(0.013)	(0.016)	(0.026)
log_imp	0.032*	0.034*	-0.023	0.011	0.015	-0.050
	(0.017)	(0.019)	(0.034)	(0.016)	(0.018)	(0.039)
log_unempl	0.012	0.013	-0.019	0.011	0.013	-0.020
	(0.009)	(0.011)	(0.018)	(0.009)	(0.011)	(0.021)
log_inflat	0.001	0.001	-0.003	0.001	-0.000	-0.003
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)
log_inv	-0.002	0.003	0.044**	0.004	0.009	0.057**
	(0.010)	(0.010)	(0.021)	(0.009)	(0.009)	(0.022)
log_gov_exp	-0.004	-0.019	0.067	0.012	-0.003	0.046
	(0.015)	(0.021)	(0.041)	(0.014)	(0.021)	(0.043)
_cons	-0.569	-0.992*	3.503***	-0.137	-0.389	3.132**
	(0.454)	(0.549)	(0.957)	(0.467)	(0.624)	(1.412)
Obs.	1527	1527	764	1527	1527	764
R-squared	0.971	0.986	0.931	0.976	0.988	0.949
Country & Year FE	YES	YES	YES	YES	YES	YES

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[33] We do not include the Competition Policy Index (CPI) in this table as it only covers a selection of countries, nor the GCI proxy (effectiveness of anti-monopoly policy) as data are available for only 10 years and comprises a rather volatile time span due to the financial recession (2007-2017).

[34] The parallel trend assumption is more likely to hold in a sub-sample of countries that are less heterogenous than the World sample (in terms, for example, of economic development), such as in the OECD countries.

Regional time trends	NO	NO	NO	YES	YES	YES

Table 6: log-log, CLI and income inequality, OECD data

	(1)	(2)	(3)	(4)	(5)	(6)
	log_gini_mkt	log_gini_disp	log_ehii	log_gini_mkt	log_gini_disp	log_ehii
log_cli_overa~m	-0.019**	-0.013	-0.037	-0.014	-0.009	-0.054***
	(0.009)	(0.016)	(0.026)	(0.011)	(0.016)	(0.015)
log_lifeexp	-0.026	-0.669	0.225	-0.170	-1.010*	0.095
	(0.367)	(0.523)	(1.344)	(0.428)	(0.588)	(1.435)
log_gdp_pc	0.017	0.012	-0.149	0.009	0.015	-0.126
	(0.036)	(0.049)	(0.097)	(0.036)	(0.048)	(0.092)
log_exp	-0.018	-0.091*	0.164	0.016	-0.067	0.188*
	(0.039)	(0.053)	(0.119)	(0.036)	(0.056)	(0.110)
log_imp	0.055	0.094*	-0.187*	0.018	0.069	-0.216**
	(0.045)	(0.050)	(0.101)	(0.045)	(0.050)	(0.100)
log_unempl	0.017	0.028	0.015	0.023*	0.042**	0.007
	(0.012)	(0.019)	(0.028)	(0.013)	(0.021)	(0.027)
log_inflat	0.003	0.001	0.006	0.001	-0.000	0.002
	(0.003)	(0.003)	(0.008)	(0.003)	(0.004)	(0.007)
log_inv	-0.019	-0.035	0.141	0.009	0.016	0.181**
	(0.034)	(0.044)	(0.091)	(0.038)	(0.047)	(0.088)
log_gov_exp	-0.075*	-0.206**	0.053	-0.066**	-0.198**	0.079
	(0.041)	(0.076)	(0.121)	(0.032)	(0.077)	(0.096)
_cons	-0.734	2.222	3.761	-0.158	3.458	3.979
	(1.570)	(2.422)	(6.011)	(1.900)	(2.796)	(6.552)
Obs.	660	660	347	660	660	347
R-squared	0.927	0.980	0.950	0.940	0.983	0.966
Country & Year FE	YES	YES	YES	YES	YES	YES
Regional time trends	NO	NO	NO	YES	YES	YES

In the full World dataset, the association between the CLI and the various inequality measures is inconsistent (Table 5) which likely reflects the significant underlying heterogeneity in the global dataset including how the level of development might impact on the relationship as described in section 4. The results in Table 6 which are based only on OECD data, are more consistent and show that other things being equal, an increase in the CLI score is associated to a statistically significant decrease by 2% and 5% in the Gini and ehii inequality measures respectively in specifications 1 and 6. The rest of the regressions reports a negative coefficient β_{CLI}, even though they are not significant. To take account of the element of 'persistence' of income inequality over time (and the issue of endogeneity as its direct consequence), we apply the GMM model to both World and OECD samples. Results are shown in Table 7. This confirms the negative and significant effect of the CLI on the Gini measures for both samples. A one per cent increase in the CLI score is associated, *ceteris paribus*, with a decrease in income inequality of between 0.4% and 0.7%.

Table 7: GMM, CLI and income inequality

	(1) Log_gini_ mkt	(2) Log_gini_ disp	(3) Log_gini_ mkt	(4) Log_gini_ disp
L.log_gini_mkt	0.936***		0.932***	
	(0.028)		(0.021)	
L.log_gini_disp		0.896***		0.908***
		(0.024)		(0.018)
log_cli_overall	-0.002	-0.004*	-0.007**	-0.007**
	(0.002)	(0.002)	(0.003)	(0.003)
log_lifeexp	0.051*	0.046	0.042	0.058
	(0.030)	(0.033)	(0.063)	(0.083)
log_gdp_pc	0.013***	-0.008	0.010*	-0.008
	(0.003)	(0.006)	(0.006)	(0.008)
log_exp	-0.010***	-0.010*	-0.001	-0.024***
	(0.004)	(0.005)	(0.006)	(0.009)
log_imp	0.005*	0.003	-0.000	0.017*
	(0.003)	(0.005)	(0.006)	(0.009)
log_unempl	0.005***	0.002	0.003	-0.001
	(0.001)	(0.003)	(0.002)	(0.003)
log_inflat	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
log_inv	-0.000	0.001	0.001	-0.016**
	(0.002)	(0.004)	(0.006)	(0.008)
log_gov_exp	0.005	-0.000	0.036***	0.011
	(0.004)	(0.003)	(0.012)	(0.010)
_cons	0.000	-0.216	-0.454*	-0.244
	(0.000)	(0.131)	(0.263)	(0.334)
Obs.	1517	1517	660	660
Sample	World	World	OECD	OECD
Time FE	YES	YES	YES	YES
N. instruments	809	790	631	631
Autocorrel II order	0.32	0.10	0.30	0.002

Robust standard errors are in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Given the unbalanced nature of our panel data, when we run the regression with the full set of controls, many observations drop out of the sample because of missing data, restricting the time span to nearly two decades. This results in a 'large N, short T' dataset more amenable to the implementation of the GMM model. The standard post-estimation tests are run, and with respect to the Arellano-Bond test, a rejection of the null (such as in column 4) may raise concerns suggesting that deeper lags might be included in this specification to remove possible endogeneity.[35] With respect to the Hansen test, its p-value is > 0.90 across the specifications

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[35] We decided to run the same model and include the same number of lags with respect to the Gini measures, as they share a similar structure in data and in order to ensure a better comparability across the four specifications.

in Table 6, suggesting the potential presence of 'too many' instruments. The estimates are still robust, but they are weakened by the number of internal instruments.[36]

We re-run the model for the EHII by including the same set of controls but shaping the element of 'persistence' slightly differently than in Table 8 by including two optimal lags of the EHII variable to avoid the presence of serial auto-correlation.[37] As for the post-estimation results, the Arellano-Bond test p-value ranging between 0.56 and 0.76 (respectively in column 1 and 2), and with a p-value of 0.36 and 0.98 for the Hansen test. Table 8 presents the results, which are consistent with the ones shown in Table 6, with a negative effect of the CLI score on the ehii index: other things being equal, a one per cent increase in the competition law index leads to a 4% reduction of the ehii score in the OECD countries. We do not find a statistically significant effect of the CLI concerning the World sample, even though the negative sign is confirmed.

Table 8: GMM, CLI and wage inequality

	(1) log_ehii	(2) log_ehii
L.log_ehii	0.600***	0.890***
	(0.214)	(0.209)
L2.log_ehii	-0.292	-0.178
	(0.234)	(0.191)
log_cli_overa~m	-0.006	-0.040***
	(0.014)	(0.015)
log_lifeexp	0.029	0.663
	(0.250)	(0.809)
log_gdp_pc	-0.017	0.028
	(0.037)	(0.063)
log_exp	0.020	0.075
	(0.022)	(0.051)
log_imp	-0.001	-0.080
	(0.028)	(0.049)
log_unempl	0.004	0.015
	(0.008)	(0.021)
log_inflat	-0.002	0.008
	(0.003)	(0.006)
log_inv	0.041*	0.113***
	(0.021)	(0.035)
log_gov_exp	0.005	0.112
	(0.028)	(0.093)
_cons	2.414*	-2.815
	(1.376)	(3.229)
Obs.	667	307

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[36] The results hold when adding each control at a time (to prevent spurious correlation), with negative correlation in all columns and statistically significant results in most. We have tested several other specifications for the Gini measures, including a collapsed instruments form, similar to the analysis in Table 8. However, results were undermined by inconsistency with respect to all variables in the estimation equation suggesting a form of multicollinearity. We therefore decided to follow the full form aknowledging the potential weakness raising from the number of instruments.

[37] We also collapsed the number of instruments to ensure its number is lower than the count of panel groups N.

Sample	World	OECD
Time FE	YES	YES
N. instruments	56	56
Autocorrelation II order	0.56	0.76

Robust standard errors are in parenthesis. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

As for to the control variables, while some of them are more sensitive to the sample on which the analysis is performed (World vs OECD) or the type of inequality measures employed in the analysis (such as gross Gini versus net Gini), others are robust across specifications, such as the positive coefficient associated to the unemployment measure, the pro-equality effect of the exports and, on the contrary, the positive coefficient linked to the imports.

6.2   Geographical Networks of Competition Law

Following the CLI index, we use the eight regional organisations that have some form of competition policy which operates in the geographical area: the European Free Trade Association (EFTA), the East African Community (EAC), the Caribbean Community (CARICOM), the Common Market for Eastern and Southern Africa (COMESA), the European Economic Area (EEA), the European Union (EU), the Economic Community of West Africa States (ECOWAS), and the West African Economic and Monetary Union (WAEMU). Only the competition laws of the EU and EEA operate in the same spheres of member states domestic laws, meaning that they obtain powers over the country competition law regulations. Yet all of these eight regional organisations operate to create a network of cooperation and enforcement of competition law (Bradford and Chilton, 2018). As a way to capture the scope and potential impacts of this cooperation, we aggregate the country-level CLI used in estimations presented in section 6.1 using an average of the network, per year. For example, the CARICOM score of the given year is the average of the CLI score of the 14 members of that organisation.[38] We directly test the robustness of this strategy using a placebo model in Section 7.

For consistency, we use estimation equations 1 (column 1-3) and 2 (column 4-6). Table 9 presents the results of the full dataset, using the aggregated proxy for geographical cooperation laws country and year fixed effects with regional time-trends. All estimations show a negative correlation between the scope of the law (aggregated for the regional cooperation), and four of the six estimates are statistically significant. The difference between the two

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[38] Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominican Republic, Grenada, Guyana, Jamaica, Haiti, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago.

estimation equations is apparent when the regional time trends absorb most of the variation in the dataset. Still, the ehii seems robust throughout the estimations. Table 10 presents the results controlling for country and year fixed effects with income group time trends to make sure the effect is not a result of non-geographical economic development trends. For example, in the event that some economic shocks affect mostly low-income countries.

Table 9: log-log, Network CLI and income inequality, World data

	(1)	(2)	(3)	(4)	(5)	(6)
	log_gini_mkt	log_gini_disp	log_ehii	log_gini_mkt	log_gini_disp	log_ehii
log_cli_network	-0.022**	-0.017**	-0.040*	-0.012	-0.009	-0.064**
	(0.008)	(0.009)	(0.021)	(0.012)	(0.012)	(0.032)
log_lifeexp	-0.001	-0.006	0.072	0.015	-0.010	0.087
	(0.062)	(0.052)	(0.094)	(0.070)	(0.068)	(0.098)
log_gdp_pc	0.059***	0.064**	-0.014	0.031	0.040	-0.006
	(0.021)	(0.027)	(0.028)	(0.025)	(0.031)	(0.034)
log_exp	-0.016	-0.022**	0.016	-0.007	-0.012	0.009
	(0.010)	(0.011)	(0.016)	(0.010)	(0.011)	(0.017)
log_imp	0.041***	0.040***	-0.006	0.024*	0.024	-0.007
	(0.014)	(0.015)	(0.025)	(0.013)	(0.015)	(0.028)
log_unempl	0.011	0.011	-0.002	0.009	0.010	-0.001
	(0.007)	(0.008)	(0.017)	(0.007)	(0.008)	(0.019)
log_inflat	0.001	0.001	-0.003	0.001	0.000	-0.006
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
log_inv	-0.014*	-0.009	-0.009	-0.008	-0.003	-0.003
	(0.008)	(0.009)	(0.017)	(0.007)	(0.008)	(0.017)
log_gov_exp	-0.005	-0.010	0.032*	0.006	-0.000	0.039*
	(0.009)	(0.011)	(0.017)	(0.010)	(0.012)	(0.022)
_cons	-1.629***	-1.674***	3.230***	-1.512***	-1.519***	2.919***
	(0.291)	(0.282)	(0.397)	(0.327)	(0.341)	(0.359)
Obs.	2125	2125	1139	2125	2125	1139
R-squared	0.969	0.985	0.912	0.974	0.987	0.928
Country & Year FE	YES	YES	YES	YES	YES	YES
Regional time trends	NO	NO	NO	YES	YES	YES

Robust standard errors are in parenthesis *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10: log-log, Network CLI and income inequality, World data

	(1) log_gini_mkt	(2) log_gini_disp	(3) log_ehii
log_cli_network	-0.013	-0.011	-0.049**
	(0.009)	(0.010)	(0.021)
log_lifeexp	0.054	0.031	0.151
	(0.062)	(0.057)	(0.137)
log_gdp_pc	0.056**	0.065**	-0.022
	(0.025)	(0.030)	(0.029)
log_exp	-0.017*	-0.023**	0.016
	(0.010)	(0.011)	(0.017)
log_imp	0.034**	0.035**	-0.003
	(0.015)	(0.017)	(0.027)
log_unempl	0.012*	0.012	-0.000
	(0.007)	(0.009)	(0.019)

log_inflat	0.000	0.000	-0.004
	(0.002)	(0.002)	(0.003)
log_inv	-0.004	-0.002	-0.008
	(0.008)	(0.009)	(0.018)
log_gov_exp	-0.003	-0.010	0.030*
	(0.008)	(0.011)	(0.017)
_cons	-1.800***	-1.801***	2.962***
	(0.287)	(0.296)	(0.536)
Obs.	2125	2125	1139
R-squared	0.972	0.986	0.915
Country & Year FE	YES	YES	YES
Income group time trends	YES	YES	YES

Robust standard errors are in parenthesis *** $p<0.01$, ** $p<0.05$, * $p<0.1$

7.   Robustness Analysis

In this section, we present the sensitivity analysis to confirm the validity and the robustness of our findings.

7.1   Competition Intensity and Competition Law

We run alternative specifications to test the robustness of our results. Different control variables have been used, and results remain overall consistent and are confirmed, as shown in Table 11. More specifically, we used the secondary school enrolment as the human capital proxy and the annual GDP per capita growth rate (instead of life expectancy and the GDP per capita, respectively).

Table 11: log-log, GCI perceived competition and trust in competition law, control sensitivity

	(1)	(2)
	log_compet_ intens	log_compet _intens
log_anti_monopoly	0.457***	0.344***
	(0.091)	(0.075)
log_schoolsecond	-0.118	-0.103
	(0.091)	(0.086)
log_exp	-0.000	0.062
	(0.145)	(0.111)
log_imp	0.019	-0.013
	(0.146)	(0.107)
log_unempl	-0.010	-0.014
	(0.033)	(0.038)
log_inflat	0.009*	0.005
	(0.005)	(0.006)
log_inv	-0.077	-0.053
	(0.077)	(0.065)
log_gov_exp	-0.131	-0.131
	(0.095)	(0.107)
gdp_pc_g_anu	0.000	0.001
	(0.001)	(0.001)

_cons	2.222***	2.129***
	(0.651)	(0.707)
Obs.	334	334
R-squared	0.785	0.832
Country & Year FE	YES	YES
Regional time trends	NO	YES

Robust standard errors are in parenthesis *** $p<0.01$, ** $p<0.05$, * $p<0.1$

7.2 Inequality and Competition Law at the Country level

Similarly, we test the consistency of our results also with respect to the inequality-competition law relationship, by using the alternative set of controls. Results are reported in Table 12.

Table 12: log-log, CLI controls sensitivity, OECD data

	(1) log_gini_mkt	(2) log_gini_dis p	(3) log_ehii	(4) log_gini_mk t	(5) log_gini_dis p	(6) log_ehii
log_cli_overall	-0.018*	-0.013	-0.032	-0.016	0.003	-0.053**
	(0.010)	(0.019)	(0.025)	(0.011)	(0.010)	(0.019)
log_schoolsecond	-0.035	-0.009	0.113	0.010	0.010	0.077
	(0.040)	(0.046)	(0.109)	(0.039)	(0.027)	(0.115)
log_exp	-0.011	-0.087	0.200**	0.017	0.007	0.205**
	(0.044)	(0.061)	(0.078)	(0.040)	(0.015)	(0.076)
log_imp	0.053	0.103	-0.223***	0.024	0.003	-0.233***
	(0.052)	(0.062)	(0.051)	(0.057)	(0.018)	(0.058)
log_unempl	0.019	0.023	0.021	0.024*	0.012	0.015
	(0.011)	(0.018)	(0.024)	(0.014)	(0.011)	(0.022)
log_inflat	0.002	0.002	0.001	0.001	-0.002	0.002
	(0.003)	(0.003)	(0.008)	(0.003)	(0.002)	(0.005)
log_inv	0.001	-0.039	0.208***	0.018	0.012	0.240***
	(0.037)	(0.060)	(0.052)	(0.039)	(0.010)	(0.057)
log_gov_exp	-0.085**	-0.200**	0.043	-0.069*	-0.027	0.069
	(0.041)	(0.074)	(0.114)	(0.038)	(0.024)	(0.083)
gdp_pc_g_anu	-0.001	-0.000	-0.003**	-0.001	0.000	-0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
_cons	-0.564*	-0.575	2.470***	-0.901***	-1.067***	2.547***
	(0.289)	(0.400)	(0.693)	(0.286)	(0.120)	(0.621)
Obs.	586	586	307	586	586	307
R-squared	0.925	0.979	0.956	0.937	0.988	0.975
Country & Year FE	YES	YES	YES	YES	YES	YES
Regional time trends	NO	NO	NO	YES	YES	YES

Robust standard errors are in parenthesis *** $p<0.01$, ** $p<0.05$, * $p<0.1$

7.3 Inequality and Competition Law at regional cooperation level

We also re-run the model presented in Table 9, by using the competition law score averaged at the regional network level as an independent variable but taking into account the different

timing of each regional network's foundation, to see if some substantial differences arise. Results are reported in Table 13 and are generally consistent with those presented in table 9.

Table 13: log-log, Network CLI and income inequality, World data

	(1) log_gini_mkt	(2) log_gini_disp	(3) log_ehii	(4) log_gini_mkt	(5) log_gini_disp	(6) log_ehii
log_cli_network	-0.028***	-0.022**	-0.032	-0.004	-0.008	-0.052
	(0.009)	(0.009)	(0.020)	(0.017)	(0.018)	(0.046)
log_lifeexp	-0.362***	-0.367***	0.228	-0.136	-0.310*	0.499
	(0.092)	(0.111)	(0.195)	(0.137)	(0.172)	(0.346)
log_gdp_pc	0.056*	0.071*	-0.041	0.042	0.070	-0.053
	(0.030)	(0.038)	(0.057)	(0.036)	(0.046)	(0.072)
log_exp	-0.004	-0.019	0.034	-0.007	-0.020	0.014
	(0.019)	(0.020)	(0.026)	(0.020)	(0.023)	(0.032)
log_imp	0.032	0.038*	-0.041	0.030	0.039*	-0.031
	(0.021)	(0.022)	(0.035)	(0.020)	(0.023)	(0.044)
log_unempl	0.015*	0.019	-0.013	0.018**	0.022	-0.018
	(0.009)	(0.012)	(0.023)	(0.009)	(0.013)	(0.025)
log_inflat	- 0.003	-0.004	0.003	-0.003	-0.003	0.002
	(0.003)	(0.003)	(0.005)	(0.003)	(0.003)	(0.006)
log_inv	0.002	0.009	0.004	-0.001	0.006	0.010
	(0.010)	(0.013)	(0.016)	(0.009)	(0.013)	(0.020)
log_gov_exp	-0.004	-0.008	0.043	0.005	-0.003	0.031
	(0.013)	(0.016)	(0.031)	(0.015)	(0.020)	(0.042)
_cons	0.026	-0.572	3.233***	-0.810	-0.811	2.223
	(0.504)	(0.584)	(0.941)	(0.671)	(0.807)	(1.509)
Obs.	1047	1047	547	1047	1047	547
R-squared	0.942	0.986	0.916	0.950	0.987	0.923
Country & Year FE	YES	YES	YES	YES	YES	YES
Regional time trends	NO	NO	NO	YES	YES	YES

Robust standard errors are in parenthesis *** $p<0.01$, ** $p<0.05$, * $p<0.1$

In Table 14, we provide a direct counterfactual test to the model presented in Table 9 with averaged regional CLI score, by randomising the simulation and selecting countries at random from the World dataset but keeping the same proportions of countries in each placebo network. In our initial model, a total of 87 countries cooperate, creating a total of 5220 observations (before including controls). Hence, for the placebo test, we randomised a sample of 87 countries out of 193 in the full world dataset. In doing so, we should not expect to find a consistent negative significant relationship across specifications, as countries are randomly assigned to the placebo regions, and no real cooperation occurs among them.

Table 14: log-log, Network CLI placebo and income inequality, World data

	(1) log_gini_mkt	(2) log_gini_disp	(3) log_ehii	(4) log_gini_mkt	(5) log_gini_disp	(6) log_ehii
log_cli_placebo	0.007	0.015	-0.030**	0.001	0.012	-0.026
	(0.012)	(0.011)	(0.015)	(0.014)	(0.013)	(0.017)
log_lifeexp	0.008	0.003	0.054	0.016	-0.010	0.101
	(0.060)	(0.050)	(0.071)	(0.071)	(0.069)	(0.079)
log_gdp_pc	0.060***	0.066**	-0.017	0.031	0.041	-0.015

	(0.021)	(0.027)	(0.032)	(0.025)	(0.030)	(0.041)
log_exp	-0.015	-0.020*	0.023	-0.006	-0.011	0.017
	(0.010)	(0.011)	(0.016)	(0.010)	(0.011)	(0.017)
log_imp	0.040***	0.039**	-0.011	0.024*	0.024	-0.012
	(0.013)	(0.015)	(0.023)	(0.013)	(0.015)	(0.024)
log_unempl	0.012*	0.012	-0.006	0.010	0.011	-0.004
	(0.006)	(0.008)	(0.017)	(0.007)	(0.008)	(0.019)
log_inflat	0.001	0.001	-0.002	0.001	0.000	-0.005
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)
log_inv	-0.012*	-0.007	-0.009	-0.007	-0.003	-0.003
	(0.007)	(0.008)	(0.016)	(0.007)	(0.007)	(0.017)
log_gov_exp	-0.010	-0.012	0.031*	0.000	-0.003	0.028
	(0.007)	(0.008)	(0.016)	(0.007)	(0.009)	(0.019)
_cons	-1.619***	-1.659***	3.362***	-1.486***	-1.490***	3.355***
	(0.282)	(0.276)	(0.311)	(0.331)	(0.342)	(0.277)
Obs.	2158	2158	1132	2158	2158	1132
R-squared	0.969	0.986	0.911	0.974	0.987	0.925
Country & Year FE	YES	YES	YES	YES	YES	YES
Regional time trends	NO	NO	NO	YES	YES	YES

Robust standard errors are in parenthesis *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The β_{CLI} is not statistically significant across the placebo specifications, except in column 3 (but it becomes not significant once we control for geographical regional time trends). The other regressions show no significant correlation or even a positive β_{CLI} with the inequality measures using the same set of controls as before, which provides support for the robustness of the results in Tables 9 and 10.

8.   Discussion

The results presented in section 6 suggest a number of key insights about the relationships between competition law, competition and inequality. First, we find strong evidence of a link between competition law and perceived competition intensity. Given the commonly held presumption that more competitive markets should, other things equal, be associated with lower levels of inequality (Comanor and Smiley, 1975; Ennis et al., 2017; Guadalupe, 2007; Khan and Vaheesan, 2017) these results imply that the existence of an effective competition law regime might naturally result in lower levels of inequality other things equal.

Second, when delving deeper into the data, our modelling suggests that the scope and comprehensiveness of a competition law regime are often associated with the degree of

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inequality. In almost all estimations, we find a consistent negative relationship between the comprehensiveness of competition law and inequality. This relationship is statistically significant in some specifications, implying that the more comprehensive competition law regimes are correlated with lower levels of inequality. Once the models are adapted to take account of the persistence of inequality across time, we generally continue to find a negative relationship between the comprehensiveness of a competition law regime and inequality, with the results being enhanced for those coefficients which are statistically significant.

Third, the results suggest that the relationship between competition law and inequality may depend on a country's level of development. For example, while the results suggest a negative correlation between competition law comprehensiveness and inequality in high income countries (such as OECD member states), the relationship is less clear for countries in lower income brackets and at the World level. While myriad factors could explain this result, we conjecture that there may be a threshold for development after which competition law begins to have a more positive impact on competition and inequality. Among the factors which could combine to create such a threshold include: the institutional capacity and resourcing of competition law authorities; the independence of competition law and degree of political involvement; and the ability of wider stakeholders (such as affected consumers or their representatives) to be more actively involved in the development and application of competition law.

Fourth, we find evidence that membership of a geographic competition law network – such as the European Union, ASEAN or COMESA – which, at a minimum, involves cooperation and collaboration between among countries located in similar regions, may have an important impact on observed inequality. Most strikingly the analysis shows a significant negative relationship between the scope of the law at the aggregate regional cooperation level and all three inequality measures in some specifications. This result appears robust given that

a random allocation of countries to different groupings do not produce the same results, implying that the cooperation and collaboration associated with being a member of a specific regional competition law network is robustly associated with the level of inequality. Again, while various factors could explain these results, it is possible to conjecture that this might reflect the fact that effects of competition law can operate at a wider scale than individual jurisdictions. In other words, competition law actions against a particular company in one jurisdiction could have cross-border impacts within a region without the need for action by each specific jurisdiction. It could also reflect the fact that such regional cooperation arrangements can involve information and data sharing across authorities.

Fifth, the analysis suggests that the relationship between competition law and inequality can vary depending on the specific inequality indicator examined. Two observations stand-out. The first observation is that, in most specifications, there appears to be a stronger statistical relationship between competition law and the gross (or market) Gini measure as compared to the net (or disposable) Gini measure. In other words, it appears that competition law has a stronger negative impact on pre-tax incomes than post-tax incomes. This raises an important point about the interaction between taxation policies and other complementary policies in tackling inequality. Competition law is a form of pre-distribution, and not redistribution, policy such as taxation. As such, the potential benefits of competition law in reducing inequality, which are captured by changes in the gross Gini, might be negated, amplified or even cancelled out, by the taxation and expenditure regimes adopted in a specific jurisdiction such that the net Gini does not show any conclusive impact of competition laws anymore. A second observation concerns the apparent differences between the income-based measures of inequality (Gini) and the wage-based measures (ehii). The results generally indicate a more consistent significant negative relationship between competition law and wages, than they do for competition law and income. There might be many reasons why we observe this systematic trend. One

explanation might relate to the methodological procedure used to construct each proxy. The ehii is wage-based and created from an industry pay dataset and as such does not include capital income, financial commissions, capital gains and, more in general, any source of income which might be related to the volatility of capital markets. An alternative more speculative explanation is that competition law might act as a policy tool to favour rent sharing among workers, which could eventually translate into a lower level of wage inequality. This may arise where competition law is targeted towards industries/sectors where the bargaining power of workers and their labour share have been declining over time. In these settings, competition law enforcement might constrain the ability of highly skilled or high-management type workers to extract profits, making the distribution of wages more equal.

A final observation relates to the relationship between the various controls and inequality. The data for the control variables is derived from the standard sources, and the results are generally robust and consistent for the control variables across the various specifications, such as the positive coefficient associated to the unemployment measure, the pro-equality effect of exports and, on the contrary, the positive coefficient of imports. One notable area of difference for some of the controls variables is between the specifications which use income as a measure of inequality and specifications which use wages. For example, the relationship between GDP and wage inequality is generally negative but insignificant, while the relationship between GDP and income inequality is positive, and in some cases, significant in some specifications. As described above, this may reflect underlying differences in the construction of the various inequality measures.

9. Conclusion

It is increasingly acknowledged in public discourse that competition law could by having important effects on levels of inequality (Shapiro, 2018; Stiglitz, 2017) and could be one of the

main contributors of income imbalances (Deaton IFS review, 2019). However, the specific ways and mechanisms through which a competition law regime might interact with economic inequality remain largely unexplored from an empirical perspective. This lack of empirical understanding about exactly how competition law could affect economic inequality is arguably becoming more urgent, particularly given the acknowledged practical and political challenges and difficulties of using traditional mechanisms such as taxation and public expenditure to address inequality in many countries.

In this paper, we empirically investigate the relationship between competition law and income and wage inequality by taking advantage of new large-scale global datasets which cover many countries over a long-time horizon. We find empirical support for a link between competition law and perceived competition intensity which, on standard reasoning, implies that effective competition law regimes should be associated with lower levels of inequality. This presumption is supported by our analysis of the direct impact that competition law has on various income and wage inequality indicators. We find consistent evidence that competition laws can have a negative, and in some specifications statistically significant, impact on income inequality at the macro level. Digging deeper into the data, we discover that the relationship between competition law and inequality appears to be affected by factors such as the level of development of a country, membership of a geographic competition law network, and the metric used to capture inequality (e.g., income or wages). We offer some conjectures as to why each of these different factors could be impacting on the results obtained. Although the overall results suggest that the effect of competition law on inequality is generally small, and not always significant across all specifications, it does not necessarily appear to be immaterial when considered alongside some of the other standard inequality drivers. In our view, this finding alone merits further and more detailed analysis about the exact transmission

mechanisms which could link the different attributes of a competition law regime with economic inequality.

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