Assessing Competition Policy on Economic Development

Tilsa Oré Mónago[*]

ABSTRACT

Implementation of competition policies is one of the most recommended strategies to developing countries as a tool for achieving economic development. Using a panel dataset of over 100 countries and 7 years (from 2005-2011), I estimate the effect of competition on economic development, and also determine which of the comprehensive policy factors are the most relevant for increasing competition. A fixed effects instrumental variable approach is used.

I find that competition intensity positively impacts economic development. The estimate is highly significant when effectiveness of antimonopoly policy and squared years of experience handling competition law are used as instruments for competition intensity. Political stability is shown to be a determinant for higher achievement in development. Macroeconomic environment and financial market development are also significant factors that contribute to higher economic development. Less developed countries should work intensively to improve their institutional quality and implement pro-competitive policies that are not only related to competition laws.

Keywords: competition policy, economic development, competition law.

JEL Codes: D41, L44, O43

Evaluación de las políticas de fomento de la competencia para el desarrollo

RESUMEN

La implementación de políticas de competencia es una de las estrategias más recomendadas para países en desarrollo para conseguir el desarrollo económico. Usando un conjunto de datos panel de más de cien países durante siete años (desde 2005-2011), estimo el efecto de la competencia en el desarrollo económico. También determino cuáles de los factores de política integral son los más relevantes para incrementar la competencia. Se usa un enfoque con variables instrumentales de efectos fijos.

Encuentro que la intensidad de la competencia impacta positivamente sobre el desarrollo económico. La estimación es altamente significativa cuando se usan como instrumentos de la intensidad de competencia: la efectividad de la política antimonopolio y los años de experiencia manejando leyes de competencia al cuadrado. Se demuestra que la estabilidad política es un determinante de mayor éxito y desarrollo. El entorno macroeconómico y el desarrollo del mercado financiero también son factores significativos que contribuyen a un mayor desarrollo económico. Los países menos desarrollados deben trabajar intensamente para mejorar su calidad institucional e implemente políticas pro-competencia que no solo estén relacionadas a las leyes de competencia.

Palabras clave: políticas de competencia, desarrollo económico, leyes de competencia.

JEL Codes: D41, L44, O43

1. INTRODUCTION

In recent decades, concern about competition has led countries to implement competition policies. As part of this, many countries have enacted competition laws aimed at ensuring that markets perform in a competitive way for the sake of social welfare, avoiding harmful effects of anticompetitive market behaviors and structures. In 1980 only 15 countries had enacted competition laws, 30 years later, that number increased to 123 and most of this increase took place during the nineties[1] (Kronthaler, 2007, 2008). Likewise, the interest to promote competition has heightened because of the mega-merger cases and increased potential cross-borders anticompetitive practices, which also makes less developed countries more vulnerable against the anticompetitive practices of transnational corporations (Evenett, 2003, Singh, 2002).

From a theoretical approach, competition may lead to economic growth, innovation, and consumer and social welfare through improvements in market efficiency and productivity; therefore we should expect a positive relationship between competition and economic development. Although researchers have not found a clear causal relationship, there is an accepted recommendation that favors competition promotion through the implementation of competition policies and laws, as happens with most of the international organizations, such as the United Nations (UN), the World Trade Organization (WTO), the International Monetary Fund (IMF), the African Development Bank (ADB), and the Inter-American Development Bank (IADB) (Marcos, 2006, Kronthaler, 2007).

However, due to the existence of different development levels, competitive conditions and country specific characteristics, it is possible to expect that competition policies may differ across countries at different development levels. Indeed, the effective

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[1]   58 countries enacted their laws during this period.

This scenario is consistent with both the increasing worldwide economic liberalization and the reforms towards market-led economies since the nineties.

implementation of competition policies in developing countries has to deal with obstacles such as budget constraints, weak academic and technical infrastructure, excessive bureaucracy, high level of informality, corruption and, possibly, political resistance to implement reforms (Khemani & Dutz, 1995; Laffont, 1999; Metha, 2003).

Given the increasing concern regarding competition policies and laws, and the diverse experiences from their implementation, it is interesting to examine the nature of competition in markets of both developed and developing countries in order to assess the link between competition policies and development. Using data mainly comprised of perception data from the Global Competitiveness Report of the World Economic Forum and the World Bank Governance Indicators, I estimate the effect of competition on economic development and also determine which of the comprehensive competition policy factors are the most relevant. I use a panel data analysis for above 100 countries over the period 2005-2011 (period for which there is available information). I based my study in a previous study model proposed by Krakowski (2005) conducted for a cross-sectional data. I extend this model setting to use longitudinal data. The advantages of doing this are mainly related to the size of the sample, besides the gains of using a more complete information that allow us to analyze overtime variations and cross-sectional variations. To control for endogeneity and unobserved heterogeneity under the panel data setting, I use a fixed effects instrumental variable approach.

Competition intensity is found to have a positively impact on economic development. The estimate is highly significant when effectiveness of antimonopoly policy and squared years of experience handling competition laws are used as instruments for competition intensity. The role of political stability is shown to be a determinant of higher achievement in development. Macroeconomic environment and financial market's development are also significant factors that contribute to higher economic development. Based on these results, less developed countries should work to improve their institutional quality and to implement pro-competitive policies that are not only related to antitrust and/or Merger and acquisition laws (from here on I will refer them as competition laws), but also to a more comprehensive set of policies. As a recommendation, countries should consider improving their consumer policies to enhance the quality of demand in order to enhance competition. Competition policy implementation implies integral policies which do not rely solely on one institution (completion authorities for example) but on many.

The rest of the paper is organized as follows, section 2 presents a general literature review, section 3 addresses the definitions of competition and competition policy to determine the scope of the latter. Section 4 explains the relationship between competition and development and section 5 shows the empirical application. Conclusions are given in section 6.

2. LITERATURE REVIEW

The topic of competition has highly researched and many attempts to measure its impact on development have been done (Khemani & Dutz, 1995; Rey, 1997; Dutz & Vagliasindi, 2000; Vagliansidi, 2001; Cook, 2001, 2002; Singh, 2002; Aubert, 2003; Evenett, 2003, 2003; Krakowski, 2005, 2006; Voigt, 2006; Kronthaler, 2007)[2]. Many of the research studies are based on case-by-case analysis or specific to a sector (Malerba *et al.* 2001; Metcalfe, 2002; Giulietti *et al.* 2005; Stewart *et al.* 2007), while others are related to specific normative discussions about CP (Vickers, 1995; Tirole, 1999; Audretsch *et al.*, 2001).

According to Singh (2002), countries at different levels of development and governance capacities require different types of competition policies. Current competition policies in the United States and the European Union are unsuitable for developing countries. These countries need policies that combine forces of competition and co-operation to enhance economic development and industrialization.[3] The differences between countries are given in the definition of dominance, the treatment of cartels, and enforcement (World Bank, 2002, cited in Singh, 2002).

There is not a strict definition of market dominance –market dominant position[4] –; it varies across countries (in the way it is measure and the threshold used). For example, cartel treatment may differ according to the scope and definition of specific practices (exploitative practices, restrictive agreements, tie-in sales, etc), the procedures and sanctions, among other provisions (APEC, 2008)[5]. More important, enforcement is not only related to the severity of sanctions but mainly related to institutional quality.

Depending on market structure and the economic development, different competition policy approaches may lead to decisions that are contrary to the primary objective of enhancing competition. Cook (2002) argues that a competition policy focused on market structure (concentration rates of firms) rather than the behavior of concentrated firms may result in decisions that increase rather than reduce the risk of anti-competitive practices (namely collusion) among enterprises in developing countries[6].

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[2]   Research studies that analyze the relationship between competition policies and trade such as Levinsohn (1994) and the relationship between competition and investment such as Schmutzler (2009), have remained as working papers and were not published in reputed journals.

[3]   As happened with East Asian countries like Japan during the fifties and sixties.

[4]   Condition that allows firms to enjoy market power and therefore give them advantages to enjoy extra economic profits.

[5]   Exploitative practices are those anticompetitive practices related to the exercise of market power to set, excessively high or low that otherwise would not be possible. The conflictive issue is the determination of the threshold when prices turn to be abusive. Restrictive agreements are those practices exercised by dominant firms such as exclusive contracts in order to restrain competition. Tie-in-sales are referred to those practices such as bundling of products, exercised by dominant firms to avoid competition.

[6]   This happens because these countries have asymmetric firms (with different market shares and capacity size) where collusive agreements may not be sustained, considering that small firms may find it difficult to prevent a big firms from leaving the agreement, and big firms have less or non-incentives to collude.

Stewart *et al.* (2007) presents a broad analysis of the competition law experiences of several developing countries. By analyzing the differences in the implementation of competition laws and their relationship with competition policies, they conclude that the effectiveness of competition laws is positively related with the pre-existence of pro-competitive market ideology within the society. The most important conclusion of this study is that there is not one universal format of market competition, but instead this should be designed taking into account each country's idiosyncrasies. This is in line with what Pistor (2000) concludes about standardization of laws in developing countries, and what Gal (2001) finds about country specific characteristics, particular of small economies, based on rules of thumb used in competition policy as well as on more general policy prescriptions, such as policy goals, trade-offs and remedial tools. She also finds that economy size necessarily affects the optimal competition policy that should be adopted by a country.

Aubert (2003) finds—by using a theoretical two-country model—that less developed countries that attach more importance to domestic industry profits may prefer to have more concentrated industries because, among other reasons, the costs of antitrust enforcement surpasses the benefits[7]. Thus, when the market is closed, a poorer country would prefer less antitrust intervention. Likewise, under a common market assumption, countries may benefit from the antitrust effort of the other country therefore market openness may not always bring gains to poorer countries.

From the institutional viewpoint, Marcos (2006) argues strong institutions are a primary condition to enjoying the benefits of competition policy implementation. Among the most important institutions are property rights protection and an effective system of contract enforcement to ease and secure economic transactions, as well as the independence of competition authorities (such as the Federal Competition Commission in the USA) from government and any political interest. The pre-existence of a market system is also a key factor. Dysfunctional markets where informality prevails—due to excessive regulation for example—are less likely to benefit from the implementation of competition policies. Marcos (2006) recommends implementing competition policy after a certain level of institutional development is reached.

In line with this claim, the empirical research of Voigt (2006) attempts to measure the impact of legal foundations and institutional independence of competition policies.

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[7]   Furthermore, it is important to highlight that competition policies result from different motivations. In the special case of Asian countries the interest in competition policy was strengthened after the financial crisis revealed that poor competition conditions helped bring on the crisis. Previously, competition policy perhaps was not needed, as far as they presented a long history of direct government intervention in the market and also because it was in conflict with industrial policies—especially policies which promoted large corporations and conglomerates in certain selective industries such as heavy and chemical industries, and semiconductors, etc. (Lin, 2002; Singh, 2002).

A positive correlation is found between the effectiveness of competition policies and competition authority independence and economic foundations of legal framework[8].

Kronthaler (2007) explores the effectiveness of competition law implementation and the factors for competition enforcement enhancement. According to his results, economic development level influences competition law effectiveness only in the short run. Most important is that effectiveness improves as time of implementation increases. Smaller economies seem to have more effective competition enforcement. This might be related to the fact that these countries have fewer firms (or fewer large firms), so the initial impact and concern over competition is more rapidly perceived than in a large country. Openness to trade is also found to be a significant factor in ensuring effectiveness and, corruption seems to have a significant negative influence on the enforcement of competition law. Although, it might be the case that group interests may influence policy decisions and use competition law on own behalf, Kronthaler's results shows that competition law is perceived as more effective when it is disconnected from any perception of biased protection towards interest groups.

Dutz and Vangliasindi (1999) and Vagliasindi (2001) analyze competition policy in transition economies from Central and Eastern Europe and find that the main factors hindering an effective enforcement of competition law—aside from the lack of expertise by competition agencies—are institutional ones: lack of independence, transparency and effectiveness of appeals. They also find a positive relationship between intensity of local competition (at the enterprise level) and competition policy enforcement. Moreover, competition intensity is also strongly correlated with changes in competition policy implementation.

Regional studies were conducted for the countries that comprise the Asian Pacific Economics Forum (APEC). Lloyd (1997) discusses general problems with the harmonization of competition policies and concludes that there is a necessity of setting minimum standards to maximize the efficiency of competition policies in the region. Choi (1999) explores the increasing role of competition policy for the APEC region related to what has been established by the World Trade Organization (WTO) and defines four general principles of competition policy agreed by that organization.[9] The study also recognizes that legislation by itself does not ensure the implementation or execution of the competition promotion, but this legislation lacks a pro competition view.[10]

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[8]   In some cases, competition laws are designed without technical analysis and may be based on legal basis only.

[9]   These principles are: non-discrimination, comprehensiveness, transparency and accountability, and were established in the Leaders Meeting of APEC that took place in Auckland, New Zealand, in September 1999 and where «APEC Principles to Enhance Competition and Regulatory Reform» were adopted.

[10]   More recently, in 2005 the member economies of APEC and the member countries of the Organization for Economic Co-operation and Development (OECD) made a joint effort to develop a very useful tool to give a benchmark and share the best international practices that allow to improve the domestic policies in regulatory reform matter, giving rise to the so called APEC-OECD Integrated Checklist on Regulatory Reform.

Additionally APEC (2008) presents an analysis of the differences in competition laws' structures across countries and different levels of development.

3. COMPETITION AND COMPETITION POLICY

Competition is understood as the inherent force of rivalry that leads agents to act and react in order to get a common desired object, which is scarce. Under a market system with clear established rules, this rivalry leads to a dynamic structure where incentives to higher efficiency and innovation are enhanced among agents, and which finally result in social gains (Vickers, 1995). Although economic theory departs from an idealistic perfect competition situation, it gives us tools (assumptions) that allow us to recognize market problems and potentially find various solutions. In most of the cases, competition is desirable as the best mechanism to allocate resources and reach efficiency. However, there are cases where market structure is organized in a way that competition is not desirable or not feasible. For example, public utilities markets have important network economies, economies of scale and scope, and constitute a natural monopoly situation[11]. In such cases, even though competition *in* the market may not be desirable, mechanisms that use competition may be recommendable such as competition *for* the market (i.e auctions) (Laffont, 1999).

Under competition, firms strive to get a monopoly position by trying to capture consumers' preferences; this process generates conditions that derive on productive, allocative and innovative efficiencies, reflected in more production of goods and services, at lower prices due to reduced costs, higher quality, and at wider variety. For the firms, this efficiency allows them to increase productivity and sales, not only in the local, but also global markets. In the medium and long-run, competition stimulates companies' innovation and creation, which create a virtuous spiral that fosters existing markets' development and the development of new markets. Therefore, it can be argued that competition would help economies to achieve higher economic development by generating strong incentives to create wealth (and knowledge) and allows societies to enjoy greater welfare.

Assuming a perfect world—a world having many sellers and many buyers who are both price takers, perfect and complete information, absence of externalities, homogenous goods and free market mobility—perfect competition ensures a market equilibrium that maximizes social welfare. Although the real world is far from satisfying such conditions, competition promotion is still a valid goal as a mechanism to increase social and market efficiency. Implementation of competition policies is not related to how far economies are from competition perfection, but to how much the economic

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[11] The operation of one firm may be more efficient and access regulation may be preferable for the society to be better off.

situation can be improved from current competition conditions.[12] Hence, competition policy can be defined as the set of policies that promote competition and pro-competitive markets (where it is possible and desirable to do it) by (i) generating the mechanisms to eliminate obstacles and difficulties that prevent the free interaction of market forces, (ii) trying to bridge information gaps, (iii) reducing artificial market barriers, and (iv) preventing (or eliminating) any conduct or behavior that harms or impedes competition and the well-functioning of markets. These policies would include those that affect market structure, firms' behavior and economic performance. Therefore industrial and fiscal policy that directly affects business behavior should be considered part of this set of competition policies (Rey, 1997).

Thus, competition policies, as a broader concept, comprise policies that enhance market conditions to promote competition, such as the enactment of competition laws, to reduce market barriers, to reduce informational asymmetries and promote reliable information diffusion, to establish, reinforce and/or build strong institutions that respect property rights protection, and to show commitment of government to conduct sound policies, and to extend and provide effective public infrastructure facilities.

3.1. Competition Law

It should be distinguished that competition laws usually do not include all the necessary policies or pro-competitive provisions to be considered as competition policy laws. Competition laws are usually restricted to antitrust, which is used to prevent, detect and punish anticompetitive practices in order to secure fair play for market forces and firms' behavior. In general, antitrust deals with restrictive agreements and abuse of dominant position or monopoly power, such as collusive agreements for market allocation, price fixing, restraints to produce and refusals to deal (supply), predatory pricing, unjustifiable discrimination practices, exclusivity contracts to avoid competition, etc[13]. Whereas, antitrust deals with firms' behavior, market structure provisions are left to legislation dealing with mergers and acquisitions (M&A). Under this legislation, market concentration is regulated and mergers should be approved by the competent authority, the competition agency or authority.

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[12] Hayek (1948, pp. 92-106).

[13] It is important to highlight that the World Bank and OECD distinguish two types of abusive practices: exploitative abuses and exclusionary abuses. Exploitative abuses refer to situations where a firm takes advantage of its market power by charging excessively high prices to its customers, discriminating among customers, paying low prices to suppliers, or through related practices. Exclusionary abuses occur when a firm attempts to suppress competition by refusing to deal with a competitor, raising competitors' costs of entering a market, or charging predatory prices, among other practices (APEC, 2008).

3.2. To reduce market barriers

3.2.1 Reduce entry market barriers

Economies, particularly less developed ones, deal with a large red-tape burden, lengthy procedures and costly transactions costs that discourage new participants into the market. Opening a business in the formal market can be an endless and tiring adventure. As a result markets size ends up too small and concentrated in a few dominant firms that do not face incentives to improve in terms of efficiency. Moreover, informal markets usually arise and may account for a significant share of economic transactions and activity, therefore hindering economic flows and considerably limiting market benefits to societies[14]. Reducing entry barriers would foster market dynamics making markets more contestable. The presence of potential competition would not only derive short-run welfare gains (reduced prices), but also long run welfare gains because the threat of competition enhances established firms' incentives to innovate.[15] In fact, high rates of entry are usually related with high rates of innovation and increases in efficiency (Geroskie, 1995, p. 431).

Market access policies should be driven towards easier and quicker procedures to start a business. This is a challenging task for most developing countries, but it is a basic and necessary step in reducing unnecessary transaction costs. Market access relevance has been increasing and it is currently one of the recommended reforms to economies, as pointed out by the annual *Doing Business Index Report* of the World Bank.

3.2.1 Reduce exit barriers

Exit may be as important as entry for efficient resources allocation. Exit barriers may discourage firms even under easy entry to markets, mainly because it would be difficult to recover assets or transfer them from one market to another if firms wish to do so (due to failed performance or other reason). It is important to remember that decisions to participate in certain markets are based on the possible value that potentially would be added to assets. Therefore, it is reasonable that capital mobility (namely assets) would also encourage making more efficient use of them.

Thus a system that is implemented to facilitate the smooth exit of firms from markets, recovering asset value as much as possible, is the insolvency and bankruptcy system.

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[14] Although coverage of production may be fulfilled by informal markets, the quality of those goods (second-hand goods or services) is far from desirable. Also, informal markets do not help economic accountability and national accounts, and usually cause huge tax burdens on the formal players, once again discouraging willing participation, private investment, and, of course, innovation. Refer to De Soto (1986) for a broader explanation of transaction costs and informal markets.

[15] Although entrants might not be the main source of innovation, what is true is that either way, entry stimulates established firms to innovate products (a more variety of products would be produced) and processes (production costs are reduced).

Its purpose is to contribute to market efficiency by helping financially distressed firms to re-allocate their resources when restructuring (if it is possible), maximizing the recovered value of their assets in order to comply with creditors who may use those assets in other more efficient entities, minimizing the misuse period of physical assets and human capital, and preserving financial stability (INDECOPI, 2000).

An effective insolvency system increases the credit access of firms by mitigating financial risks and contributing to financial market development, and also encourages private sector growth by preserving value (Uttamchandani, M.). All factors together help to increase reliability of markets, develop credit systems, increase predictability, and market mechanism efficiency, and also help weak economies to resist economic crises by reducing costs.

3.3. Reduce informational asymmetries and promote reliable information diffusion

Reducing informal asymmetries and promoting reliable information diffuse is a big task because it comprises several policies. Although information diffusion is a broad concept and helps all the economic agents to make better decisions, in this case I focus only on the information that empowers the demand side of markets. Firms' efficiency does not only come from the mere existence of a competitor, but moreover is enhanced from a diligent, educated and exigent demand. Constant advances in production processes and technology to improve product quality emerge from the concern to satisfy consumers' needs and preferences.

Unlike theory, where competition is given in a scenario with complete and perfect information and a large number of "rational" consumers, the real world challenges us with information asymmetries that tend to be larger the less developed a country is, which also lessen consumers' awareness of their role and therefore may not behave "rationally" as economists theorize. Although rationality is an issue that is out of the scope of this study, I rely on the accepted claim that the more information consumers have, the better decision they may take. Thus, a policy that pursues reducing informational asymmetries by promoting the use of standards (i.e. making goods more comparable) and quality infrastructure (i.e. certificates that make it easy to distinguish a high quality good to a low quality one), promoting market information diffusion of prices, locations, certifications, etc., and making this information accessible, would definitely reduce searching costs for consumers and would have an important impact in their decision-making processes.

The goal may be to reduce information asymmetries by spreading information, which would allow increasing the pool of cognizant buyers (i.e. diligent consumers). Diligent consumers make educated choices and may push existing firms to improve efficiency and to innovate, and thereby may contribute to develop markets. Consumer education is a key issue; therefore consumer agencies should continuously endeavor to

facilitate information to consumers, looking for mechanisms that may improve their decision variables; for example, promoting understandable and relevant product labeling practices and facilitating price comparisons by encouraging uniform metric unit pricing information[16]. The ultimate goal would be to build an informational infrastructure than empowers consumers, but overall that makes both private and public sectors more transparent and accountable. In this respect, the use of information and communication technologies has been useful.

3.4. To establish, reinforce and/or build strong institutions that respect property rights protection and show commitment of government to conduct sound policies

3.4.1. Establish property rights protection

In any market system establishing property rights protection is the initial and crucial step. Without property rights, market transactions are extremely difficult, if not inexistent. As De Soto (2000) argues, poor people remain poor because they simply lack private property, as long as they are endowed with collective properties that are difficult to trade.

Having property rights allows individuals to trust in markets for trading their assets, but the number of these transactions will be greater when done under a system that secures the rights over the properties. More important is the positive impact that property rights protection has over investment decisions in the private sector.

Furthermore, "when property rights protection is low and the size of (the) informal economy is relevant, the perspective of establishing an effective competition policy to fight against anticompetitive practices in the market is rather illusory (Marcos, 2006)."

3.4.2. Reinforce and/or build strong institutions that provide a credible environment

Reinforcing and/or building strong institutions is a broad task, but necessary for achieving a more credible and accountable institutions, which may work effectively in an autonomous way (independent from political power) and may enable contract enforcement and stable and predictable environment (Tirole, 1999). Besides, it is very important is to reduce the inefficiencies of the legal system. Lengthy judicial trials discourage trust in the legal system and increases contract costs because disputes are neither easily nor quickly resolved. When institutions are reliable, competition works better and most benefits societies. Indeed APEC (2008) shows that there exists a strong correlation between institutional quality and intensity of local competition. This is also supported by findings of studies like Dutz and Vangliasindi (1999), Vagliasindi (2001),

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[16] When similar products are released with prices over different metric units, the comparison becomes difficult and may be confusing.

Voigt (2006), Marcos (2006), Kronthaler (2007), among others. Laffont (1999) argues that, more than competition policy implementation, what matters is a strong political will to establish it and the formation of institutional foundations that would ensure market well-functioning.

3.5. To extend and provide effective public infrastructure facilities

Competition works well when firms face less exogenous constraints such as basic infrastructure (i.e. transportation, energy, communication, water etc.). Lack of public infrastructure facilities increases firms' costs, and therefore hinders efficiency gains of market forces. Not only does poor infrastructure increase production costs through poor energy service provision, but also though increases in distribution costs due to transport and communication costs. These higher costs are transferred to the consumers through higher prices.

Investment decisions are also compromised by poor public infrastructure. These decisions are limited to feasible projects that reduce costs. In particular, lack of transport infrastructure, prevents trade to further distances (hinders international trade and inter-regional trade), increases logistic costs, isolates markets (consequently favoring local dominant firms and hindering market innovation), reduces consumers' options, prevents inter-regional competition and discourages new entrants to enter the market, incentivizes economic centralization (where infrastructure is more available) in detriment to distant regions, and increases economic development asymmetries across regions and inefficiencies and social distress (income disparity, less social welfare, etc.). Therefore, in less developed countries where transport and communication system are often inefficient, and, as consequence, trading organization are weak or incipient, the gains of competition may be eroded.

4. COMPETITION AND DEVELOPMENT

Despite the common belief and consensus regarding the benefits of competitive action towards higher level of development, there is not strong statistical evidence about this causal relationship. Competition is thought to influence economic development mainly because it affects performance by driving incentives towards higher efficiency levels (Vickers, 1995; Rey, 1997; Carlin and Seabright). Competition affects economic agents' behavior for the following reasons: (i) it allows performance comparisons—Benchmarking provides agents with a basis for comparative performance, gives opportunities to improve managerial strategies and also increases managerial efforts to do things better; (ii) it gives competitive pressure to agents (entrepreneurs)—besides increasing incentives to improve, the threat of losing market share or failing (i.e. bankruptcy risk and financial risk),

influences the discipline and care in making decisions. Thus competition enhances efficiency and productivity.

It is important to mention that the competition process, by pushing firms to do better, improves overall efficiency through a selection process and reallocation of resources to fields where they are efficiently used. During this continuous process of selection, agents develop a dynamic incentive to innovate, and it is this continuous innovation that helps achieving greater economic development.

Because the interplay between firms in the marketplace should be protected to ensure market forces work well, most of the competition concerns have been focused particularly on market behavior (antitrust) and market structure (mergers and acquisitions); therefore, competition legislation has been thought as a key factor in economic reforms. Researchers such as Krakowski (2005) distinguish competition policy in a narrow and broader sense than previous studies. The author is one of few researchers that accounts for competition law enactment and enforcement, as well as public policy factors that enable market to work better and to ease competition driven forces.

The presence of competition is not dependent on the existence of competition laws. Although the Asian tigers lacked explicit competition laws and had important government interventionism in their development take-off, competition was promoted. Local firms were often challenged with greater goals and exposed to fierce external competition. Competition was also promoted by national contests conducted to select favored firms (often, under performance-based criteria).

The implementation of competition policy and laws turns out to be more relevant considering that the increase in international trade has generated more concern in improving markets´ competitiveness (i.e. lower prices at higher quality). Thus, this increasing awareness implies that promoting market dynamism encourages firms to devote more effort for continuous innovation.

The reasons that led countries to implement competition laws differ across countries, but the main two reasons can be identified: (i) the bottom-up approach, in which countries enacted their laws in response to major concerns about high market concentration, thus competition laws were enacted to lay the foundations for the well-functioning of the free market. Canada and the United States (who also have the oldest laws) represent this approach; and (ii) the top-down approach, where countries implemented competition laws as part of major economic reforms to shift from a more interventionist scheme towards a market-based regime (Latin American Countries for example), aiming to prevent private monopoly power resulting from privatizations of state-owned firms. Asian countries, such as Japan and South Korea, that after having developed technology-based economies and accounted for big corporations, implemented their competition laws to promote competition and reduce market power of those national champions (corporations)after the Asian financial crisis.

Stweart *et al.*, (2007) compare and summarize the main findings of case-by-case competition laws implemented across developing countries, seeking to find whether this positively or negatively impacted development. They find that the enforcement of competition laws has contributed to a sort of "economic democracy" process. Therefore effective competition protection within and across markets—preventing and sanctioning anticompetitive behavior (abuse of dominant power and collusive agreements) that restricts or excludes competition—would prevent market concentration that leads to less welfare, guaranteeing firms a fair and free competitive environment, and would make countries more reliable for private investment and more appealing to foreign investment. Competition legislation would also empower countries against anticompetitive practices of big multinational corporations. However, there is still much to do so that increase cooperation among countries would be needed to protect competition from trans-border anticompetitive practices (Singh, 2002; Stweart *et al.*, 2007).

According to Stweart *et al.*, (2007), productivity increases as a result of competition law implementation and enforcement have been evidenced in countries such as Tanzania where productivity increased 13% to 24%; also the estimated welfare loss in South Korea was reduced from 8.5% to 3.3% between 1980 and 1995 after the implementation of various pro-competitive reforms. Competition enforcement would led many countries to prevent anticompetitive practices, and avoid welfare losses: remittances companies in Uzbekistan, the airline market in Costa Rica and the chicken market in Peru. In other cases, the lack of enforcement and the presence of corruption arose as crucial factors that diminish benefits of competition laws, as happened in Nepal where the competition authority was captured by the firms. Trade liberalization and openness were also found to be important determinants to enhanced social welfare. In the Egyptian cement market the gains rose due to increased production levels; in contrast, cases such as Morocco, where liberalization was not implemented, the competition law implementation derived in lower benefits, due to less competitive pressure that firms faced and that led in low efficiency gains.

In general, the case studies reviewed by Stweart *et al.* (2007) indicate that the existence of a competition law is not sufficient to ensure a competitive environment. Legislation should be taken as part of a general competition policy designed within an economic development strategy. Following Gal (2001), transparency of administrative processes and regulations, competition agency or authority reputation (conducted by reputed judges for example), institutional strength and independence are required to enhance the effectiveness of competition laws.

Figure 1 illustrates the interactions of different factors that may impact competition and development. I am assuming that the channel through which many market policies affect development is competition improvement. As stated before, competition may affect economic development, but also the relationship may be the other way around, usually the more developed countries have higher competition intensity.

Figure 1. Competition and Development
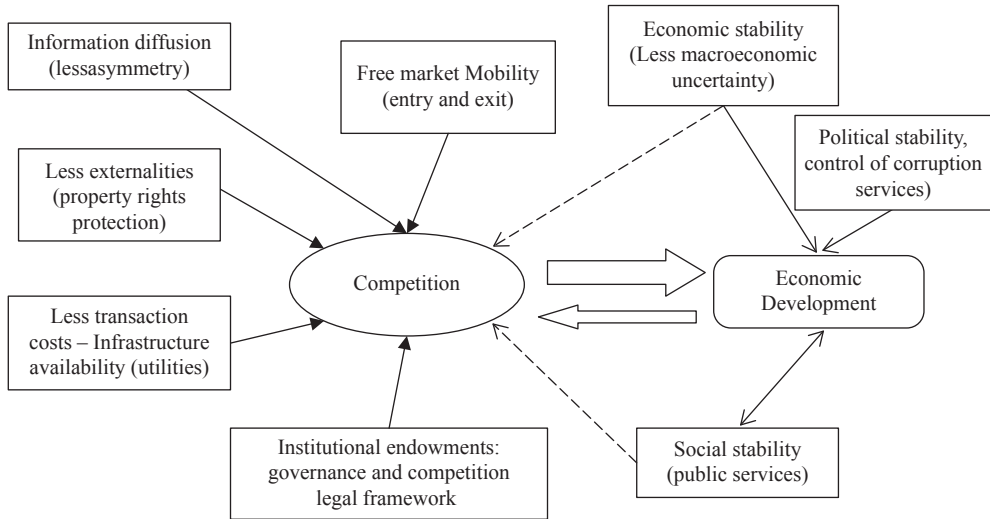
It is worth noting that competition improvement is taken as transmission channel of market policies to economic development. In the following section I model these interactions; competition is affected for many factors, among them I highlight the effectiveness of the Competition Law (antimonopoly policy) and economy's size. The first would affect exogenously to competition intensity, while the second may simultaneously determine within the system. For simplicity, policies related to economic and social stability are assumed to affect competition though their impact on economic performance in national income terms. Next section describes in detail the model setting.

5. EMPIRICAL ANALYSIS

5.1. Model

In order to conduct an empirical analysis, I model the ideas that were discussed in the previous section by setting up a system of equations, borrowing the approach used by Krakowski (2005), who analyzes the impact of the effectiveness of antitrust policy on development. Unlike the mentioned author that uses a cross-sectional analysis, I use a panel data approach. I also included new variables that account for some of the discussion presented above and use a panel data analysis. The model is specified through three structural equations: (1) development equation (2) competition intensity equation, and (3) the competition law effectiveness equation. I assume a linear relationship among exogenous and endogenous variables.

$$y_{it} = \beta_{0i} + \beta_1 ILC_{it} + \beta_2 GI_{it} + \beta_3 SI_{it} + \beta_4 MI_{it} + v_{it} \tag{1}$$

$$ICL_{it} = \gamma_{0i} + \gamma_1 Y_{it} + \gamma_2 Inst_{it} + \gamma_3 EAP_{it} + \gamma_4 MB_{it} + \gamma_5 IA_{it} + \gamma_6 ID_{it} + \gamma_7 QD_{it} +$$
$$\gamma_8 EC_{it} + \gamma_9 MC_{it} + \varepsilon_{it} \qquad (2)$$

$$EAP_{it} = \delta_{0i} + \delta_1 GE_{it} + \delta_2 ExpCL_{it} + \omega_{it} \qquad (3)$$

Where[17]:

y:	log of income (GDP) per capita, log(GDP/pop).
ILC:	intensity of local competition
GI:	governance indicators that help to increase credibility and predictability on the public sector and government
SI:	social indicators
MI:	macroeconomic environment and development of financial markets
RD:	Regional dummy variables
Y:	economy size (market size), log of GDP.
Inst:	institutional variables
EAP:	effectiveness of anti-monopoly policy
MB:	market mobility barriers variables such entry and exit barriers,
IA:	infrastructure facilities availability
ID:	Information diffusion and accessibility to it (use of internet is presumed as crucial).
QD:	quality of the demand.
EC:	external competition.
MC:	Market concentration.
GE:	Government effectiveness
ExpCL:	Experience of applying competition law provisions. Number of years since the respective law was enacted and squared experience.

5.2. Data

I use annual data, for the period 2005-2011 for around 116 countries (average number of countries per year in the panel dataset), obtained from the annual Global Competitiveness Reports 2005/2006 – 2011/2012 of the World Economic Forum (WEF-GCR). I updated the data set with information from the World Economic Outlook Database of International Monetary Fund (IMF-WEO), the World Development Indicators of the World Bank (WB-WDI), the Worldwide Governance Indicators of the World Bank (WB-WGI), the Doing Business Report 2011/2012 of the World Bank (WB-DBI), and the Human Development Report of the United Nations (UN-HDI). Finally, I used information from the Global Competition Forum (GCF), Kronthaler (2007), and individual website of existing competition authorities to get the date of enactment of competition laws across countries.

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[17] Details on the indicators are given in the next section.

It is important to highlight that data from the WEF-GCR is widely used in several of the variables. Most of the indexes from WEF-GCR are based on subjective qualifications and perceptions[18], collected from the annual Executive Opinion Survey carried out by the WEF to 13,000 business leaders from 142 economies. The same concern also applies to the governance indicators of the WB-WGI which reports indicators for 213 economies over the period 1996–2010 that capture perceptions of surveyed agents (from business sector, non-governmental organizations, international organizations, and think tanks) on six dimensions of governance quality.[19] Although an important part of the information in subjective, it is still relevant to be taken into account to analyze the economic performance across countries, let's recall that economic agents also respond to perceptions and build expectations based on them.

Thus, I have an unbalanced panel with around 800 data points in the entire dataset. The number of countries varies from 102 to 124 countries when it is split by years; Table 1 gives distribution of sample distribution overtime across regions.[20]

Some concerns may be raised due to the crisis period the dataset includes; since 2008 the world faces a global crisis that has hit many of the developed countries, and from which many are not still recovered. Some of the reported data on income levels are slightly kept, but rarely diminishes. This may affect the estimates; however, it is possible to account for time effects in the panel data estimation as a solution to address this global economic crisis problem and its potential effects on estimates' biases.

Table 1. Distribution of the number of countries per region per year in the Panel Data

Year	Americas (LAC and North America)	Europe and Central Asia	Sub-Saharan Africa	Middle East and North Africa	Asia and Oceania	Total
2005	21	39	16	8	18	102
2006	22	40	21	8	19	110
2007	21	43	22	11	19	116
2008	21	43	24	13	20	121
2009	21	44	23	13	20	121
2010	21	45	26	13	19	124
2011	22	45	23	11	19	120
Average	21.3	42.7	22.1	11.0	19.1	116.3
(%) of total average	18.3%	36.7%	19.0%	9.5%	16.5%	100.0%

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[18]   For example, they measure quality of high education, quality of demand, or quality of infrastructure.

[19]   Voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption (for further information see http://info.worldbank.org/governance/wgi/index.asp).

[20]   Those for which there is almost complete data.

In order to compare the different development performances across countries, the per capita Gross Domestic Product weighted by the purchasing power parity (GDP ppp) is taken as an indicator of economic development due to its advantages of comparability of standard of living across countries.

The intensity of local competition index is used as indicator of ICL and it is expected to have a positive impact on development. The effectiveness of anti-monopoly policy index is used as indicator of EAP, and it is also related to the reliability on antitrust policy, a higher EAP index would increase competition intensity.

In the case of the exogenous variables the chosen indicators are the following: for the GI, political stability index and control of corruption index are used, more stability and accountability improves government reliability and positively affect development. For SI, a health index, an education indicator and the urban population are chosen; a direct relationship with development is expected. For MI, the macroeconomic environment index and the development of financial markets index are used as proxies; economies with more stable macroeconomic foundations would positively impact development.

Likewise, for market size, I use the log of GDP, big markets may allow firms to exploit economies of scale, and therefore may allow for increasing market efficiency and innovation investment, intensifying competition levels. For institutional variables I use property rights protection index and the rule of law and accountability index. Market mobility barriers include entry and exit barriers indicators, which are expected to negatively affect competition intensity. For IA, I use the infrastructure facilities/availability index that is a composite index of the quality and availability of public utilities and transport infrastructure. Infrastructure is a key variable due to its immediate effect on operative and transaction costs; the less transport infrastructure is, the less competition level is expected[21].

The chosen information diffusion indicators are the percentage of internet users and the percentage of mobile telephone subscriptions, this due to the influence of information and communication technologies on spreading information worldwide. For QD, I use the quality of the demand index that measures the perception of the sophistication levels of consumers when they made decisions; diligent and exigent consumers (demand) would push firms to improve efficiency. To measure external competition I use the openness to trade indicator, a positive sign is expected. For the market concentration variable, the extent of market dominance index is used; according to the construction of

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[21] Particularly a deficient transport infrastructure hinders distribution chain, raises logistic costs and therefore prices, isolates markets (consumers and producers) increasing the likelihood of local dominant firms (and its abuses) and avoids consumers to enjoy from more options, at the end also prevents markets to benefit from expanding investment.

the index, higher values indicate less concentration[22]. Thus less concentration of firms is expected to increase competition intensity.

For GE, I use the property of rights indicator and the government effectiveness indicator that measures the perception of government commitment to design and render its policies with low or non-political interest biases. Finally, for measuring the experience dealing with competition laws, I use the number of years since the respective law was enacted and the squared value of that number. Table 1A in the Appendix presents in detail the chosen indicators, their definition, units of measurement and their sources.

Table 2 shows the main descriptive statistics of the indicators, some important differences are seen between the mean and median for variables such as those of governance indexes (political stability, control of corruption, rule of law, and government effectiveness), and those for market barriers (particularly for the entry costs indicator). When the full sample is split into four subsamples[23] according to their income levels (low income, low-middle income, upper-middle income and high income), it is possible to observe suggestive relationships between the income levels and the indicators. For example at the mean and median levels, the governance indexes clearly increases across income group. As expected, the infrastructure index increases and market barriers decline at higher income groups. Richer countries are usually more open to trade and show larger number of internet users (more details about summary statistics according to income group is given in Table A1 in Appendix A).

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[22] Market concentration may impact competition in two different ways: (i) concentration may allow firms to exploit economies of scale, be more efficient and potentially have incentives to innovate; concentrated firms then may innovate and create new products and processes, and may also fiercely compete (oligopolistic competition), in this case concentration would intensify competition. (ii) in an opposite way, it is also argued that high market concentration increase severally the likelihood of collusion and abusive power of dominant positions, preventing economies from the gain of competition; in this case there would be a detrimental effect of concentration on competition intensity.

[23] To classify the countries into four income groups, I split the sample according to the yearly distribution of the income indicator using the quartiles as cut-off values. Thus, for each year, a country with per capita GDP per capita that lies within the first quartile of the variable distribution is classified as low income level country.

Table 2. Main descriptive statistics

Variable	Mean	Median	Máximum	Minimum	Standard deviation	N° obs
GDP pcppp (USD)	15150.10	8962.69	103275.70	335.10	15787.79	979
GDP (billion USD)	403.66	41.47	15227.07	0.33	1375.18	987
Intensity of local competition index	4.82	4.87	6.38	2.31	0.70	897
Political stability	-0.08	0.00	1.59	-2.70	0.91	985
Control of corruption	0.08	-0.22	2.59	-1.46	1.00	986
Education*	17.63	16.29	42.12	1.83	9.16	897
Urban population (%)	58.05	60.38	100.00	9.26	22.54	980
Health index	6.07	6.51	6.98	2.66	1.05	897
Macroeconomic environment	4.74	4.75	6.70	1.00	0.83	897
Financial market development	4.25	4.18	6.40	2.22	0.80	897
Total population (Millions)	45.45	10.17	1348.12	0.27	153.58	972
Rule of law index	0.06	-0.20	2.01	-1.84	0.97	986
Property Rights Index	4.53	4.42	6.67	1.75	1.09	897
Effectiveness of anti-monopoly policy index	4.01	3.90	6.19	2.34	0.89	897
Entry costs (days*costs)	3860.64	375.00	618423.50	0.00	22780.13	951
Exit costs (years*costs)	45.98	32.40	240.00	0.80	43.92	930
Infrastructure facilities index	3.83	3.69	6.77	1.47	1.26	897
Internet users (percentage)	28.27	21.30	95.00	0.05	25.41	896
Mobile telephone subscriptions/100 pop	69.99	72.49	232.07	0.14	44.58	896
Quality of demand conditions	4.17	4.10	6.15	1.97	0.77	897
Openess to trade**	94.27	81.55	445.91	22.30	56.07	935
Extent of market dominance	3.83	3.66	6.23	2.21	0.86	897
Government effectiveness index	0.16	-0.05	2.37	-1.65	0.95	986
Experience with Competition Law (years)	16.22	13.50	121.00	0.00	15.77	796

(*) Education=High education quantity * High education quality index
(**) Openess to trade=(exports+imports)/GDP
Sources: 1/ International Monetary Fund, World Economic Outlook Database (WEO), 2/ World Bank, statistics database (WDI), 3/ World Bank and CIA Factbook, 4/ Global Competition Forum (GCF) 5/ Global Competitiveness Report of World Economic Forum (WEF-GCR) , 6/ World Bank – Governance indicators (GCI), and 7/ World Bank – Doing Business Report (DBI)

5.3. IDENTIFICATION OF THE MODEL AND ESTIMATION STRATEGY

The relationship between competition and development is described by the simultaneous equations (1) and (2). The impact of competition law effectiveness is considered to be exogenous on competition intensity (equation (3)). I assume that the effectiveness

of competition law affects competition intensity and not the other way around—better effectiveness of competition law enhances competition intensity, but greater competition intensity does not necessarily make the competition law more effective. To ensure that this is the case I impose the restriction of zero correlation between the disturbances of both equations, $E(\varepsilon_{it}, \omega_{it}) = 0$. Therefore, through this covariance restriction, equation (3) in the system is identified.[24]

Equations (1) and (2) are determined simultaneously and, due to their interaction, an endogeneity problem arises since competition intensity affects development, but also economic development may affect competition intensity through the market size. Indeed market size is measured by total country income level (GDP). I have three endogenous variables in the system: Y, size, and IC. The first two are in the same variable, Y is GDP per capita ppp while size is total GDP, so I treat them as one variable and I will instrument size with the exogenous variables used as regressors of Y. To simplify the analysis I also assume that the exogeneity condition is satisfied for other covariates, i.e. $(E(x_{it}, \varepsilon_{it}) = 0$ and $E(x_{it}, \omega_{it}) = 0$, where x comprises all the other regressors in the system.

Thus, I address the endogeneity problem by using excluded exogenous regressors from each equation as instruments for the right-hand-side endogenous variable. For instance, the variables Inst, EAP, MB, IA, ID , QD, EC and MC are used as instruments of ICL in equation (1), and the variables GI, SI, MI and RD are used as instruments for Size in equation (2).

Therefore, I have two overidentified equations (equations (1) and (2)) that can be consistently estimated by using Instrument Variables approach for Panel Data, I also include multiple estimation techniques to show for robustness of the results, thus I use also 2SLS and 3SLS simultaneous system of equations regression, and the two-step GMM estimation.

Another problem in the estimation of the model has to deal with the unobserved heterogeneity. There may be some cultural effects or idiosyncratic differences across countries that may have an impact on the economic development and on how competition performs; especially when many institutional factors play an important role in the model. To control for such country specific unobserved characteristics I use fixed effects approach for the three equations (1), (2) and (3).[25] In order to control for universal shocks that may affect all countries, I include time fixed effects. Therefore, most of the estimations use two-way effects (time and fixed effects) approach.

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[24] Testing ex-post estimation whether this condition holds, I find that there is almost zero correlation between the estimated disturbances from the competition intensity and competition law effectiveness equations.

[25] Fixed effects model showed to be relevant in all cases when tested against POLS, and also by using the Hausman test, I was able to find that FE was suitable to use due to its consistency against random effects model. For the third equation, under spherical errors assumption, Hausman test favors FE model as preferable.

Unlike cross-sectional or time series data, panel data potentially deals with two sources of variance bias: heteroskedasticity across units and serial correlation within unit/country. To avoid misleading statistical inferences, we need to control for both problems (Cameron & Trivedi, 2005). Accordingly, I use panel-robust standard errors in all the estimations. Moreover, I use cluster robust estimates of the variance (for pooled OLS for example), which only require independent errors across countries and allow for intra unit/country correlation. Therefore, once I control for country and time effects I expect that the disturbances are independent across countries, but since many variables in the model are related perceptions indexes about the economy or institutions it is reasonable to expect some serial correlation within countries. Among the estimation techniques, two stage generalized method of moments (2SGMM) may have an advantage since it allows for both heteroskcedasticity and correlation overtime among disturbances.

5.4. Estimation and results

In order to work with the more accurate linear specification of the model, I use the Box Cox transformation test to find whether the level linear, level-log, log-level, or log-log model specification is the most suitable for the model. I find that I should use GDP measures in logs, while the other variables should be in levels.

As discussed before, the right-hand-side endogenous variable in the equations are instrumented by the excluded exogenous variables. It is important to highlight that when clustered robust standard errors are used, the model passes the overidentifying restriction test (Sargan and/or Hansen J test); however when homoskedastic errors are assumed we fail the test.

In order to overcome this problem I look for a second group of instruments that allow me to pass the over identification test. For the development equation, the variables effectiveness of antimonopoly policy (EAP) and the squared value of years of experience with competition law are suitable as instruments for competition intensity. They are relevant and more likely to be valid than the first set of instruments. Indeed, by using those instruments we pass the overidentification test regardless of the type of standard errors. For the competition intensity equation, in addition to political stability and financial market development, the variables population and log of per capita energy consumption are found to be good instruments. Again, according to the test, these are valid instruments regardless of the type of standard error used.

For all the cases, the F-statistic of the first stage regressions exceeds 10, which, by rule of thumb, indicates the instruments are valid. Higher values for this statistic are obtained when only the two instruments, EAP and squared experience are used.[26]

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[26] Stock and Watson (2003) suggest that if the F-statistic exceeds 10, then the instruments are valid and not weak for the endogenous variables.
See table A.6 to A.9 in the appendix.

Table 3 summarizes the estimated coefficients of the development equation. Columns 4to 7show the regression results after using instruments for intensity of local competition index (ILC) using the fixed effects IV, the fixed effects two-stage GMM, and 2SLS and 3SLS simultaneous equation estimation techniques respectively. Likewise, columns 1, 2, and 3 show the results of pooled IV, and the standard fixed effects and between effects regression results. As mentioned before, all the regressions use robust clustered standard error estimates.

I do not take pooled models are not taken into account since they do not address endogeneity and/or do not address heterogeneity issues (IV) and therefore generate inconsistent estimates. Using a family of estimators that are consistent and asymptotically unbiased, I used these multiple techniques to test for robustness. At this point of the research I rely on the asymptotic properties of the estimators rather than the finite sample properties, such as efficiency.[27] I present the results across all these multiple consistent estimators to check for robustness, showing that the results are similar across multiple techniques. Among the different techniques, fixed effects two step GMM estimator is preferred because it has smaller standard errors than the regular fixed effects IV estimator, and the estimated coefficients are similar in both cases. The 3SLS regression shows similar estimates to the previous ones, but these show, in some cases, to have smaller variances. This aspect would be due to 3SLS estimator's advantage to exploit the correlation of disturbances across the simultaneous equations, giving a gain in asymptotic efficiency over the 2SLS.

In general, from the results, we get the expected signs of the variables, although not all are statistically significant. Factors such as political stability, macroeconomic environment, and financial market development are highly significant and positive across the estimation approaches. According to the 3SLS estimates, one unit increment in these indexes (political stability, macroeconomic environment and financial market development) may increase GDP per capita by 5.02%, 3.15% and 6.39% respectively (these increases change to 4.29%, 2.22% and 6.61% when the 2-step GMM estimator is used). Additionally, one percentage increase in the urbanity level may lead to one 0.90% increase in the per capita income. A larger urban population is associated with more developed cities, better public services and better infrastructure. Urbanity helps economies to take advantage of agglomeration economies and efficiencies derived from it (less transport costs for example).

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[27]   Most of the estimators I take into account use Instrumental Variables approach and therefore would give me at least consistent estimates. To show the finite sample properties of the estimators, a tedious theoretical derivation would be needed or also a Montecarlo simulation would be desirable, in order to keep the reader focus in the results of my estimation I decided to rely in the asymptotic properties of my estimates and I avoid to go through any complicate derivation and or simulation exercise.

Health may be important, but loses statistical significance once country fixed effects are included. However, it keeps its positive sign which may confirm that higher levels of health are associated with higher labor productivity and help markets to develop.

Table 3. Outcomes of the estimation of the Development equation (eq.1)

Variable	(1) Pooled IV	(2) Fixed Effects	(3) Between Effects	(4) Fixed Effects IV	(5) Fixed Effects 2-Step-GMM	(6) Sim. Eq. 2SLS Fixed Effects	(7) Sim. Eq. 3SLS Fixed Effects
Intensity of local competition	0.163 (0.124)	0.005 (0.012)	0.001 (0.088)	0.011 (0.024)	0.012 (0.022)	0.011 (0.017)	0.015 (0.015)
Political stability	0.137** (0.054)	0.053*** (0.019)	0.150** (0.074)	0.049** (0.020)	0.042*** (0.013)	0.049*** (0.010)	0.049*** (0.009)
Control of corruption	0.127* (0.072)	0.030 (0.022)	0.049 (0.094)	0.024 (0.020)	0.022 (0.018)	0.024 (0.016)	0.026* (0.015)
Education	0.013 (0.009)	0.002 (0.002)	0.029** (0.013)	0.003 (0.002)	0.003 (0.002)	0.003** (0.001)	0.002* (0.001)
Urban population	0.016*** (0.003)	0.011* (0.006)	0.012*** (0.003)	0.010 (0.006)	0.013** (0.006)	0.010*** (0.003)	0.009*** (0.003)
Health	0.306*** (0.078)	0.007 (0.019)	0.298*** (0.077)	0.016 (0.021)	0.023 (0.019)	0.016 (0.012)	0.011 (0.011)
Macroeconomic environment	0.190*** (0.053)	0.028*** (0.008)	0.281*** (0.084)	0.029*** (0.009)	0.022*** (0.007)	0.029*** (0.006)	0.031*** (0.005)
Financial market development	0.113 (0.075)	0.063*** (0.013)	0.237** (0.093)	0.063*** (0.013)	0.064*** (0.011)	0.063*** (0.008)	0.062*** (0.008)
Intercept	4.012*** (0.564)	7 778*** (0.391)	4.342*** (1.473)			7.691*** (0.173)	7 743*** (0.155)
R^2	0.890	0.776	0.886	0.789	0.788		
Adjusted R^2	0.887	0.772	0.870	0.744	0.743		
Root mean squared error	0.398	0.045	0.446	0.047	0.048		
F-statistic	75.397	58.953		60.275	81.556		
LogLikelihood		1487.328	-75.317	1392.203	1389.507	1662.606	1683.962
N obs.	814	882	882	811	811	814	814

[1] *** , **, * denotes statistical significance at 1%, 5% and 10% level respectively.
[2] Panel robust standard errors are given in parentheses. Bootstrap errors are reported for (3), and standard errors for (6) and (7).
[3] Time dummies are considered in all the regressions, but not reported in the table.
[4] Regional dummies (Africa, Europe, LAC and Asia&Oceania) are considered in regressions (1) and (3).
[5] Columns (2), (4) – (7) use the first set of instruments as mentioned in section 5.3

From the 2-step GMM estimates, we observe that the impact of one extra point of the ILC on development (GDP per capita) would be around 1.21%, which increases to 1.51% in the case of the 3SLS estimate, nevertheless these estimated impacts are not statistical significant. This result changes when the second set of instruments are used; as shown in Table 4, the fixed effects IV and 2-step GMM estimates for the ILC are highly significant, one unit increase in ILC increases GDP per capita by 11.85%.

As before, macroeconomic environment and financial market development estimates are statistically significant, but smaller than before. One unit increment in these indexes may increase the per capita income by 2.33% and 4.81%, respectively. Political stability's estimate maintains its value and significance. Also, as before, education has a small but significant impact on development at 10% of significance level. (see Table 4).

Table 4. IV estimation of the Development equation

Variable	(1) Fixed Effects IV	(2) Fixed Effects 2-step GMM
Intensity of local competition	0.112***	0.112***
	(0.042)	(0.042)
Political stability	0.049**	0.049**
	(0.024)	(0.023)
Control of corruption	-0.024	-0.025
	(0.028)	(0.027)
Education	0.004*	0.004*
	(0.002)	(0.002)
Urban population	0.007	0.007
	(0.008)	(0.008)
Health	0.012	0.012
	(0.028)	(0.027)
Macroeconomic environment	0.023***	0.023***
	(0.008)	(0.008)
Financial market development	0.048***	0.047***
	(0.016)	(0.014)
R^2	0.744	0.744
Adjusted R^2	0.689	0.688
Root mean squared error	0.052	0.052
F-statistic	45.186	45.484
LogLikelihood	1198.634	1198.333
N obs.	737	737

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

[2/] Panel robust standard errors are given in parentheses.

[3/] Time dummies are considered in all the regressions, but not reported in the table.

[4/] Effectiveness of antimonopoly policy (EAP) and the squared value of years of experience with competition law are used as instruments for ILC.

[5/] (1)and (2)present results when the second set of instruments are used.

Different estimates for the competition intensity equation (equation 2), using similar approaches as before, are shown in Table 5. The estimates would indicate the effect of competition policy (which comprises several factors) on competition level. OLS estimation gives inconsistent estimates, and that is why it is not shown in Table 5. Columns 1 report pooled IV estimates, which will be consistent but still does not deal with heterogeneity. Columns 2 and 3 presents fixed effects and between effects estimators but they do not address the endogeneity issue, so they are inconsistent. Columns 4 and 5 report panel IV

estimation and the two stage GMM estimation for fixed effects, the latter is expected to be more efficient. Last two columns present the estimation outcomes from the simultaneous system of equation estimation using 2SLS and 3SLS technique respectively.

Table 5. Outcomes of the estimation of the Intensity of competition equation (eq.2)

Variable	(1) Pooled IV	(2) Fixed Effects	(3) Between Effects	(4) Fixed Effects IV	(5) Fixed Effects 2-Step-GMM	(6) Sim. Eq. 2SLS Fixed Effects	(7) Sim. Eq. 3SLS Fixed Effects
Market size (log of GDP)	0.103*** (0.034)	-0.011 (0.096)	0.042 (0.028)	0.539* (0.276)	0.510* (0.265)	0.543*** (0.207)	0.480** (0.186)
Rule of law	0.082 (0.074)	0.078 (0.121)	0.019 (0.101)	0.094 (0.133)	0.011 (0.120)	0.104 (0.081)	0.097 (0.072)
Property rights protection	0.147** (0.061)	0.039 (0.052)	0.132 (0.096)	0.022 (0.056)	0.063 (0.045)	0.021 (0.035)	0.025 (0.031)
Effectiveness of anti-monopoly policy index	0.206*** (0.074)	0.168*** (0.057)	0.204* (0.117)	0.135** (0.062)	0.127** (0.059)	0.128*** (0.042)	0.155*** (0.038)
Entry costs	-0.000* (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
Exit costs	0.000 (0.001)	-0.001 (0.002)	0.001 (0.001)	0.000 (0.002)	0.000 (0.002)	0.000 (0.002)	-0.001 (0.001)
Infrastructure facilities and quality	-0.086 (0.057)	-0.075 (0.051)	-0.053 (0.066)	-0.054 (0.051)	-0.048 (0.049)	-0.062* (0.035)	-0.060* (0.031)
Internet users	-0.004** (0.002)	0.001 (0.001)	-0.005 (0.003)	0.002 (0.002)	0.002 (0.001)	0.002 (0.001)	0.001 (0.001)
Mobile phone subscriptions	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001** (0.001)	-0.001* (0.001)
Quality of demand conditions	0.255*** (0.090)	0.347*** (0.097)	0.347*** (0.133)	0.279*** (0.105)	0.233** (0.091)	0.288*** (0.051)	0.295*** (0.045)
Openess to trade	0.001 (0.001)	0.003** (0.001)	0.000 (0.001)	0.004*** (0.002)	0.004*** (0.002)	0.005*** (0.001)	0.004*** (0.001)
Extent of market dominance	0.051 (0.058)	0.089 (0.054)	0.131* (0.077)	0.116** (0.055)	0.081* (0.049)	0.121*** (0.035)	0.091*** (0.031)
Intercept	1.797*** (0.260)	2.172*** (0.410)	1.101 (0.785)			0.702* (0.405)	0.844** (0.364)
R^2	0.773	0.412	0.827	0.356	0.353		
Adjusted R^2	0.768	0.399	0.799	0.214	0.211		
Root mean squared error	0.329	0.169	0.292	0.191	0.192		
F-statistic	75.903	14.962		13.074	13.352		
LogLikelihood		301.9	-14.693	261.998	260.671	1662.606	1683.962
N obs.	819	819	819	816	816	814	814

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.
[2/] Panel robust standard errors are given in parentheses. Bootstrap errors are reported for (4), and standard errors for (7) and (8).
[3/] Time dummies are considered in all the regressions, but not reported in the table.
[4/] Columns (1), (4) – (7) use the first set of instruments as mentioned in section 5.3

From the estimations, we find mixed results, some of the factors appear to have the expected sign (market size, institutional endowments, external competition, quality of demand and market dominance index) while others show a counterintuitive direction of the impact (market barriers, infrastructure facilities, and information diffusion). Although insignificant, enforcement and property rights protection show to have a positive impact on competition intensity. The market size estimate is not only significant (at least at 10% of significance level) and positive, but has an important impact on competition intensity.

This last result would imply that indeed economies of scale are relevant for firms to compete more aggressively, because of the advantages in reduced costs and efficiency. Market barrier indicators appear to be insignificant and to have almost no effect on competition intensity, and the direction of the relationships is not clear (i.e. it may vary from positive to negative). Therefore, the exit and entry barriers may not be as influential as previously thought; this may possibly be related to (i) measurement problem, or (ii) the presence of informal markets in less developed countries, which operates out of the system. Informal markets have low entry and exit barriers in order to produce for low-income markets (Cook, 2001). If that is the case, this may imply that a greater effort to "formalize" markets should be done by economies, effort should be done to increase the awareness of the importance of market access policies and insolvency systems.

Among the most significant effects on competition intensity we find that quality of demand has an important effect on competition intensity, even more than external competition or extent of market dominance would[28]. Finally, as expected the results confirm that the effectiveness of competition laws have a positive, significant and important effect on competition intensity. Its significance is robust to many econometric estimation techniques. This is confirmed when I switch the instruments to the second set (political stability, financial market development, and log of per capita energy)—see Table 6—, and the direction of the relationship, the relevance and statistical significance remains (at least at 5% of significance level). Competition laws enactment may be important, but what may make the difference is how effective they are in enhancing competition conditions. For this reason, later we examine the determinants of the effectiveness of competition laws (also known as antitrust and/or anti-monopoly laws).Table 6, also shows that quality of demand is by far one of the key determinants of competition intensity. This highlights the crucial role of consumers quality (how diligent consumers are when they take decisions, how demanding they are when looking for products and services, how educated decisions they made, etc) on improving markets competition intensity. Therefore consumer policy should be one of the leading forces to promote and improve competition.

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[28] The extent of the market dominance indicator varies from 1 (very concentrated in few firms) to 7 (low concentrated in few firms), thus we expect a positive relationship between the indicator and the competition intensity indicator.

Table 6. IV estimation of the Intensity of competition equation(eq.2)

Variable	(1) Fixed Effects IV	(2) Fixed Effects 2-step GMM
Market size (log of GDP)	-0.077 (0.260)	0.048 (0.231)
Rule of law	0.158 (0.132)	0.200 (0.123)
Property rights protection	0.071 (0.053)	0.086* (0.052)
Effectiveness of anti-monopoly policy index	0.147** (0.059)	0.137** (0.058)
Entry costs	0.000 (0.000)	0.000 (0.000)
Exit costs	-0.001 (0.002)	-0.001 (0.002)
Infrastructure facilities and quality	-0.098* (0.052)	-0.090* (0.047)
Internet users	0.001 (0.001)	0.000 (0.001)
Mobile phone subscriptions	-0.001 (0.001)	-0.001 (0.001)
Quality of demand conditions	0.438*** (0.112)	0.400*** (0.094)
Openess to trade	0.002 (0.002)	0.002 (0.001)
Extent of market dominance	0.107* (0.058)	0.101* (0.057)
R^2	0.473	0.470
Adjusted R^2	0.339	0.334
Root mean squared error	0.171	0.171
F-statistic	12.298	12.589
LogLikelihood	283.446	281.449
N obs.	635	635

[1] *** , ** , * denotes statistical significance at 1%, 5% and 10% level respectively.

[2] Panel robust standard errors are given in parentheses.

[3] Time dummies are considered in all the regressions, but not reported in the table.

[4] Political stability, Financial market development, log of per capita energy consumption and population are used as instruments for Market size.

[5] In both cases, columns (1) and (2), the second set of instruments are used.

As explained before, since antimonopoly policy effectiveness has shown to be relevant for competition intensity, and due to the positive impact of competition intensity on development (income level) found in previous analysis, I estimate the competition law effectiveness equation (equation 3). In this case, we do not deal with endogeneity, but with unobserved heterogeneity. To address this, I decided to use fixed effects, since the unobserved heterogeneity (country specific and unobserved characteristics

such as culture, law-abidance, among others) may not be orthogonal to some the regressors, specifically government effectiveness and property rights.[29]

Table 7. Outcomes of the estimation of the Competition Law effectiveness equation (eq.3)

Variable	(1) Pooled OLS	(2) Fixed Effects	(3) Between Effects	(4) Two-way Fixed Effects	(5) Between Effects with Time dummies
Government effectiveness	0.273*** (0.061)	0.254** (0.125)	0.263*** (0.067)	0.224* (0.123)	0.258*** (0.082)
Property rights protection	0.422*** (0.054)	0.381*** (0.055)	0.423*** (0.060)	0.439*** (0.061)	0.427*** (0.070)
Experience with Competition Law	0.021*** (0.004)	0.067*** (0.013)	0.019*** (0.006)	0.067*** (0.013)	0.019*** (0.008)
Experience squared	-0.000*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.000 (0.000)
Intercept	1 790*** (0.235)	1.698*** (0.295)	1.817*** (0.258)	1.436*** (0.311)	2.297*** (0.538)
Time effects	No	No	No	Yes	Yes
R^2	0.780	0.275	0.820	0.299	0.823
Adjusted R^2	0.778	0.271	0.814	0.290	0.807
Root mean squared error	0.418	0.217	0.364	0.214	0.371
F-statistic	200.965	20.915		14.259	
LogLikelihood	-410.497	85.512	-47.377	98.269	-46.366
N obs.	755	755	755	755	755

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.
[2/] Panel robust standard errors are given in parentheses. Bootstrap errors are reported for (3) and (5)

Table 7 presents the summary of the estimates, for pooled OLS, fixed effects and between effects estimator with and without time effects. The estimates across techniques are mostly similar, but I rely on the consistent two-way fixed effects estimator for the inferences.

As shown, all the covariates (with the exception of squared years of experience) are positive and statistically significant, regardless of the use of time effects. Government effectiveness has an important role on the effectiveness of the competition law, but less than the protection of property rights. When time effects are used, the coefficient of the protection of property rights increases. This may highlight the crucial importance of private property protection when the law is enforced. Greater property rights protection incentivizes private sector to invest and markets to grow, agents and firms tend to be easily identified

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[29] I also performed the Hausman Test, and under the assumption of homoskedasticity I reject the null hypothesis of equal consistency of both fixed and random effects estimator – i.e. fixed effects would be preferred, Under the non-spherical errors assumption, I was only able to fail to reject the null hypothesis – i.e. random effects estimator would be preferred – at 1% of significance level (I used xtoverid command to perform Hausman test in Stata). For greater significance levels, fixed effects estimator is found to be the only consistent estimator. Additionally, due to the less likely orthogonality condition between the regressors and the individual specific effects, I preferred not to use random effects estimator.

and problems associated with externalities (common in situation where private property is not well delimited) are reduced. These aspects may enhance the efficacy of conducting market investigations when firms are suspected to fall in any anticompetitive activity. It may also speed the procedures when competition authorities assess welfare impact of certain behaviors, by making market definition more accurate in preemptive and post-conduct investigations. As expected, the experience of managing competition laws improves effectiveness, but at lesser extent compared to the institutional factors: an additional year of experience would increase in roughly 0.3% the competition law effectiveness perception index.

5.4.1 Estimation results across different income groups

The literature indicates that the impact of competition policy should differ between less developed and developed countries; likewise, the size of an economy should also impact differently the performance of competition policy (Gal, 2001; Singh, 2002; Aubert, 2003) To test empirically if the impact of competition policy on development, the competition intensity, and competition law's effectiveness determinants vary according to the development stage of countries, I split the sample into four income groups: low income, low middle income, upper middle income and high income countries. For each year, I split the sample according to the yearly distribution of the income indicator (GDP per capita based on purchasing power parity (PPP)) using the quartiles as cut-off values. Then, I run the regressions for the three-equation model for each subsample. Below, I present the results of the fixed effects 2-step GMM estimator, the fixed effects IV estimation, and the fixed effects 3SLS estimation.

Table 8 presents the outcomes of the fixed effects 2-step GMM and fixed effects IV regressions for the development equation. The estimates are alike in most cases, but the first set of estimates presents lower variances. From the results, the intensity of local competition is only significant for the higher income countries –Although negative estimates of competition intensity are found for low and lower middle income countries, they appear not to have a significant effect on development. Competition intensity positively affects development in upper middle income countries, but in an opposite direction in high income countries. This last counterintuitive effect may be related to the downside of competition in rich economies that highly invest in Research and Development (R&D). The political stability index is significant for both low income and upper middle income countries, though it is greatly significant for the latter group.

In low income countries, the control of corruption, the financial market development, and the macroeconomic environment indexes have statistically significant and positive effects on economic development—a one unit increase in the first two indexes would increase the per capita GDP (ppp) by 9.31% and 5.33%, respectively. The macroeconomic stability index remains as statistically significant determinant of economic development across all the income groups. A one increase unit in this index would result in an increase in per capita GDP (ppp) of 1.51%, 3.05%, 3.46% and 3.25% in the low income, lower middle income, upper middle income and high income countries, respectively.

Table 8. Outcomes of the estimation of development equation (eq.1) across income groups

Variable	Fixed effects Two-step GMM estimator				Fixed effects Instrumental Variables estimator			
	(1) Low Income	(2) Low Middle Income	(3) Upper Middle Income	(4) High Income	(5) Low Income	(6) Low Middle Income	(7) Upper Middle Income	(8) High Income
Intensity of local competition	-0.003 (0.023)	-0.016 (0.023)	0.080** (0.038)	-0.105*** (0.033)	0.017 (0.032)	-0.045 (0.040)	0.092** (0.046)	-0.103** (0.049)
Political stability	0.037** (0.016)	0.031 (0.020)	0.095*** (0.024)	0.000 (0.014)	0.033 (0.020)	0.001 (0.029)	0.090*** (0.028)	-0.014 (0.026)
Control of corruption	0.089*** (0.024)	0.016 (0.033)	0.011 (0.028)	0.054** (0.023)	0.119** (0.047)	-0.015 (0.042)	0.015 (0.038)	0.084** (0.034)
Education	0.004 (0.004)	0.003 (0.003)	-0.003 (0.003)	-0.001 (0.002)	0.007 (0.005)	0.006 (0.004)	-0.001 (0.004)	0.000 (0.003)
Urban population	-0.007 (0.007)	-0.008 (0.007)	0.007 (0.008)	-0.024*** (0.009)	-0.011 (0.015)	0.004 (0.013)	0.005 (0.010)	-0.016 (0.013)
Health	0.040 (0.027)	-0.049 (0.052)	0.034** (0.015)	-0.079*** (0.028)	0.020 (0.039)	-0.069 (0.069)	0.032* (0.017)	-0.043 (0.038)
Macroeconomic environment	0.015*** (0.006)	0.030*** (0.009)	0.034*** (0.010)	0.032*** (0.011)	0.017 (0.016)	0.036*** (0.015)	0.036*** (0.014)	0.045*** (0.015)
Financial market development	0.052*** (0.014)	0.027 (0.026)	-0.019 (0.026)	0.036** (0.012)	0.059** (0.029)	0.059 (0.049)	-0.002 (0.029)	0.029** (0.013)
R^2	0.802	0.833	0.869	0.677	0.805	0.837	0.874	0.694
Adjusted R^2	0.735	0.782	0.832	0.581	0.739	0.787	0.837	0.604
Root mean squared error	0.047	0.050	0.038	0.035	0.046	0.050	0.037	0.034
F-statistic	328.019	67.918	1253.535	70.705	44.998	36.491	60.769	28.27
LogLikelihood	311.641	341.443	407.523	437.654	313.058	344.205	410.962	443.694
N obs.	179	206	209	215	179	206	209	215

1/ ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

2/ Panel robust standard errors are given in parentheses.

3/ Time dummies are considered in all the regressions, but not reported in the table. First set of instruments is used.

Table 9. Outcomes of the fixed effects 3SLS estimation of development equation (eq.1) across income groups

Variable	Low Income	Low Middle Income	Upper Middle Income	High Income
Intensity of local competition	0.016 (0.022)	-0.047 (0.029)	0.092*** (0.025)	-0.102*** (0.025)
Political stability	0.030** (0.015)	0.001 (0.020)	0.085*** (0.016)	-0.014 (0.016)
Control of corruption	0.127*** (0.033)	0.003 (0.032)	0.035 (0.027)	0.070*** (0.020)
Education	0.003 (0.005)	0.007** (0.003)	-0.003 (0.002)	0.000 (0.001)
Urban population	-0.011 (0.008)	0.002 (0.006)	0.008* (0.005)	-0.011 (0.007)
Health	0.011 (0.016)	-0.047 (0.031)	0.024 (0.017)	-0.020 (0.031)
Macroeconomic environment	0.023*** (0.009)	0.038*** (0.012)	0.036*** (0.009)	0.036*** (0.009)
Financial market development	0.061*** (0.019)	0.048** (0.021)	0.003 (0.016)	0.039*** (0.009)
Intercept	7.069*** (0.291)	8.601*** (0.294)	7 994*** (0.416)	11.560*** (0.707)
LogLikelihood	384.803	451.275	536.151	618.099
N obs.	182	206	211	215

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.
[2/] Standard errors are given in parentheses.
[3/] Time dummies are considered in all the regressions, but not reported in the table.

The estimation results of the fixed effect 3SLS regression of the development equation are shown in Table 9. The estimates are quite similar to those found with previous techniques. Most of the estimates analyzed above keep their significance, with exception of the estimates of urbanism and health indexes in the high income countries: before negative and significant and now positive and insignificant. According to the 3SLS results, the role of financial market development on economic development is statistically significant not only for low and high income countries, but also for low middle income countries.

Table 10 summarizes the estimates found by applying the fixed effects 2-step GMM and fixed effects IV techniques to the competition intensity equation (eq. 2). Likewise, Table 11 shows the estimation results obtained from a 3SLS regression. Following the 2-step GMM outcomes, the economy's size seems to have a high, positive, and statistically significant effect on intensity of local competition only for high income countries, where it might be easier to exploit economies scale due to technologies advances.

Table 10. Outcomes of the estimation of competition intensity equation (eq.2) across income groups

Variable	Fixed effects Two-step GMM estimator				Fixed effects Instrumental Variables estimator			
	(1) Low Income	(2) Low Middle Income	(3) Upper Middle Income	(4) High Income	(5) Low Income	(6) Low Middle Income	(7) Upper Middle Income	(8) High Income
Log of GDP	0.310 (0.613)	-0.163 (0.458)	0.508 (0.390)	1.055*** (0.249)	0.692 (0.851)	-0.068 (0.498)	0.473 (0.425)	0.989*** (0.297)
Rule of law	0.305 (0.187)	-0.188 (0.133)	-0.275 (0.190)	0.655*** (0.179)	0.521** (0.253)	-0.243 (0.156)	-0.194 (0.220)	0.601*** (0.203)
Property rights protection	-0.127 (0.109)	0.189*** (0.073)	0.053 (0.098)	-0.057 (0.057)	-0.150 (0.137)	0.214*** (0.078)	0.059 (0.103)	-0.077 (0.068)
Effectiveness of anti-monopoly policy index	0.158 (0.133)	0.312** (0.124)	0.234** (0.100)	0.085 (0.076)	0.069 (0.143)	0.204 (0.130)	0.224* (0.125)	0.088 (0.084)
Entry costs	-0.000** (0.000)	0.000** (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000* (0.000)	0.000 (0.000)	0.000 (0.000)
Exit costs	0.014*** (0.003)	0.011 (0.007)	-0.003 (0.002)	-0.013** (0.006)	0.013** (0.005)	0.010 (0.007)	-0.002 (0.002)	-0.015** (0.006)
Infrastructure facilities and quality	0.105 (0.151)	-0.205** (0.078)	-0.033 (0.078)	0.114** (0.054)	-0.033 (0.173)	-0.212** (0.086)	-0.034 (0.091)	0.141** (0.064)
Internet users	0.003 (0.004)	0.001 (0.003)	0.001 (0.002)	0.001 (0.002)	0.002 (0.005)	0.002 (0.004)	0.000 (0.003)	0.001 (0.002)
Mobile phone subscriptions	0.001 (0.002)	0.000 (0.002)	-0.002 (0.002)	-0.003** (0.001)	0.002 (0.002)	0.002 (0.002)	-0.001 (0.002)	-0.003** (0.001)
Quality of demand conditions	0.602*** (0.147)	0.281** (0.120)	0.319** (0.124)	0.163 (0.133)	0.714*** (0.170)	0.154 (0.134)	0.258* (0.147)	0.155 (0.154)
Openness to trade	0.005* (0.003)	0.000 (0.003)	0.006*** (0.002)	0.004*** (0.001)	0.005 (0.003)	0.000 (0.003)	0.008*** (0.002)	0.004** (0.002)
Extent of market dominance	-0.082 (0.099)	0.048 (0.094)	0.041 (0.104)	0.172** (0.077)	0.011 (0.110)	0.181* (0.105)	0.100 (0.117)	0.211** (0.096)
R^2	0.487	0.508	0.465	0.403	0.482	0.542	0.481	0.421
Adjusted R^2	0.296	0.342	0.292	0.208	0.289	0.388	0.314	0.232
Root mean squared error	0.212	0.168	0.163	0.147	0.213	0.162	0.161	0.145
F-statistic	66.588	15.478	23.309	29.127	31.897	8.872	16.481	10.808
LogLikelihood	42.064	93.383	100.03	126.089	41.153	100.829	103.281	129.375
N obs.	184	206	209	215	184	206	209	215

1/ ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

2/ Panel robust standard errors are given in parentheses.

3/ Time dummies are considered in all the regressions, but not reported in the table. First set of instruments is used.

Table 11. Outcomes of the fixed effects 3SLS estimation of competition intensity equation (eq.2) across income groups

Variable	Low Income	Low Middle Income	Upper Middle Income	High Income
Log of GDP	0.713 (0.609)	-0.108 (0.335)	0.321 (0.435)	0.851*** (0.221)
Rule of law	0.599*** (0.152)	-0.232** (0.105)	-0.209 (0.141)	0.562*** (0.142)
Property rights protection	-0.100 (0.075)	0.196*** (0.055)	0.043 (0.077)	-0.027 (0.052)
Effectiveness of anti- monopoly policy index	0.127 (0.084)	0.189** (0.081)	0.261*** (0.086)	0.071 (0.055)
Entry costs	0.000 (0.000)	0.000 (0.000)	0.000** (0.000)	-0.000 (0.000)
Exit costs	0.010* (0.006)	0.014* (0.008)	-0.002 (0.002)	-0.011** (0.005)
Infrastructure facilities and quality	-0.149* (0.086)	-0.222*** (0.056)	-0.075 (0.064)	0.091* (0.054)
Internet users	0.008 (0.005)	0.001 (0.002)	0.000 (0.002)	0.002* (0.001)
Mobile phone subscriptions	0.002 (0.001)	0.002* (0.001)	0.000 (0.001)	-0.003*** (0.001)
Quality of demand conditions	0.782*** (0.093)	0.181** (0.087)	0.247*** (0.086)	0.168* (0.088)
Openess to trade	0.005*** (0.002)	0.000 (0.002)	0.008*** (0.002)	0.004*** (0.001)
Extent of market dominance	-0.013 (0.074)	0.184*** (0.060)	0.088 (0.065)	0.229*** (0.045)
Intercept	-0.920 (2.347)	1.500 (0.872)	0.017 (2.345)	-3.640** (1.518)
LogLikelihood	384.803	451.275	536.151	618.099
N obs.	182	206	211	215

[1] *** , ** , * denotes statistical significance at 1%, 5% and 10% level respectively.
[2] Standard errors are given in parentheses.
[3] Time dummies are considered in all the regressions, but not reported in the table.

The institutional factors, such as the property right protection and enforcement (rule of law), may have different impacts on competition intensity according to the income level. Property rights protection appears to be statistical significant only in lower middle income countries, where a one unit increase in the index would increase the competition perception index in almost 19%.Contrastingly, the rule of law index is only significant in high income countries. This may happen because when property rights are already well defined and protected, as happens in most high income countries.

Law enforcement, on the other hand, becomes more determinant than before. The effectiveness of competition law index appears to have a positive effect on competition intensity, but it is only statistically significant (at 5% level) in lower and upper middle income countries. This may suggest that the competition law's impact tend to be more important when markets are in a transition stage towards development. Market barriers estimated are mixed and mostly insignificant and their impact is not clear. Particularly, at 5% of significance level, exit costs negatively affect competition intensity in high income countries, showing the insolvency system importance in developed markets.

As expected from the results in previous section, the quality of demand (buyer sophistication) has a positive and statistically significant effect on competition intensity for almost all income groups; the estimates are statistical significant at least at 10% level when the 3SLS technique is used. It is important to remark that the impact of the demand quality appears to be higher at lower income levels. This would suggest that consumer policy may be more relevant in low income countries than in the other groups.

On the other hand, the external competition estimate—measured by the openness to trade indicator—is significantly positive for the low, upper middle and high income groups. Although this factor is only significant at the 10% level according to the 2-step GMM estimator, it becomes highly significant when 3SLS estimator is used (see Table 11). Finally, regardless the statistical significance, the results show that less concentrated markets would indicate a negative influence in competition intensity only in the low income group, where the gains of economies of scale may be more important for developing future competition once markets are consolidated.[30] In developed markets (high income group), less market concentration or dominance enters the model positive and statistically significant as a determinant factor of competition intensity.

Table 12 summarizes the two-way fixed effects estimates of the Competition Law's effectiveness (CLE) equation across income groups. Property rights protection estimates indicate a significant and positive effect on the CLE.

According to the results, the impact of property rights protection is positive and statistically significant across all the income groups, showing its high relevance as determinant of the Competition Law effectiveness. On the other hand, the government effectiveness is found to be positive and significant (at 5% level) only at the lowest and highest income group; its impact appears to be greater in low income economies than in high income countries. This behavior is reasonable once we considered that most of the high income countries have higher quality institutions and better governance, transparency and accountability than in low income countries.

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[30]   It is important to recall that the extent of market concentration index ranges from 1 to 7, where 7 indicates less concentrated market, specifically indicates that «corporate activity is spread among many firms» (see Table A.1).

Table 12 also shows evidence that the experience of previously implementing a Competition Law is a positive and statistically significant factor in explaining competition law effectiveness in low and upper middle countries. Notice that this experience is statistically significant only at the 10% level in low middle income countries.

Table 12. Outcomes of the estimation of the competition law effectiveness equation (eq.3) by two-way fixed effects

Variables	(1) Low Income	(2) Low Middle Income	(3) Upper Middle Income	(4) High Income
Government effectiveness	0.610** (0.238)	0.032 (0.318)	0.037 (0.177)	0.453** (0.187)
Property rights protection	0.170* (0.095)	0.383*** (0.126)	0.571*** (0.096)	0.424*** (0.108)
Experience with Competition Law (years)	0.116*** (0.022)	0.048* (0.025)	0.111*** (0.025)	-0.012 (0.020)
Experience squared	-0.001 (0.001)	0.000 (0.001)	-0.003*** (0.001)	0.000 (0.000)
Intercept	2.072*** (0.395)	1.463** (0.626)	0.507 (0.419)	2.569*** (0.863)
R^2	0.589	0.297	0.413	0.578
Adjusted R^2	0.563	0.258	0.387	0.559
Root mean squared error	0.192	0.211	0.184	0.167
Degrees of freedom	28	30	35	32
F-statistic	10.565	3.937	15.275	12.964
LogLikelihood	40.493	29.375	64.513	84.026
N obs.	151	175	215	214

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

[2/] Panel robust standard errors are given in parentheses.

6. CONCLUSIONS

Under competition, firms strive to get a monopoly position by trying to capture consumers' preferences; this process generates conditions that derive on productive, allocative and innovative efficiencies. These efficiency gains are then reflected in more production of goods and services, at lower prices due to reduced costs, higher product quality, better accessibility, and with wider variety of options. It is argued that competition helps economies to achieve higher economic development, by generating strong incentives to create wealth (and also knowledge), and allows societies to enjoy of greater welfare.

Competition policy comprises a set of policies that promote competition and pro-competitive markets, by generating mechanisms to eliminate obstacles and difficulties that prevent free market forces, bridging informational gaps, reducing artificial market barriers and preventing any conduct or behavior that harms or impedes competition and the well-functioning of markets.

From the empirical analysis, the role of strong institutions, such as property rights protection and government effectiveness, is evidenced in their significant impact on the effective enforcement of the competition law (anti-monopoly policy), and through this on competition intensity. Institutional endowments (such as contract enforcement and property rights) although insignificant, may have a positive impact on competition. Definitely, more exigent and informed consumers contribute the most to competition intensity by improving the quality of demand.

Market barriers are found to be insignificant and to have an unclear and negligible or no impact on competition; this would be possibly related to the presence of informal markets that are disproportionately bigger in less developed countries.

According to the estimation, competition intensity significantly impacts economic development, particularly when EAP and squared experience with competition law are used as instruments of competition intensity. The role of political stability is shown to be determinant for higher achievement in development.

When the empirical analysis is performed by subsamples, splitting countries by income level into low, lower middle, upper middle and high income countries, the estimates vary across income groups. Intensity of local competition only appears to affect economic development statistically significantly in upper middle income countries in a positive way and in a negative way in high income countries. This is perhaps because in the latter group high competition may conflict with high investment in R&D. Corruption control and political stability are found to be statistically significant in low income countries; while the first keeps its significance at high income group, the second does so only in upper middle income countries. Above all, the macroeconomic environment is a statistically significant factor across all the four groups of countries.

Among the determinants of competition intensity, the economy's size is positive and significant only in high income countries, as economies of scale may be greater in these countries. Institutional factors are important and significant in some groups: rule of law has a positive effect in high income economies, and property rights protection is significant in low middle income. As before, the impact of market barriers is not clear. Only exit costs are found to have a negative and significant effect on competition. Most notably, it is remarkable that the quality of demand not only has a positive and statistically significant effect on competition intensity across income groups. Additionally, the effect of quality of demand on competition intensity is greater the lower a country's income. Openness to trade appears to have a positive and statistically significant effect in almost all income groups, whereas lower market concentrated is significant and may only favor competition intensity in high income countries.

Property Rights protection enters the model positive and significant in explaining Competition Law's effectiveness across all the income groups and its impact appears to increase with the development stage. The government effectiveness index is positive and significant in only the lowest and highest income groups. Finally, experience of handing a Competition Law is a significant and positive explanatory variable only in non-high income countries, which on average have fewer than 15 years of experience with a Competition Law.

Appendix

Table A.1. Variables and indicators

	Variables	Label	Indicators	Definition/Measure	Source
Dependent variables	Economic development	Y	Log of GDP ppp per capita	Gross domestic product based on purchasing-power-parity (PPP) per capita GDP	IMF-WEO
	Competition level	ICL	Intensity of local competition index	Perception index constructed from the answer to the question: How would you assess the intensity of competition in the local markets in your country? (1 = limited in most industries; 7=intense in most industries)	WB-DBI
	Competition law effectiveness	EAP	Effectiveness of anti-monopoly policy	The effectiveness of anti-monopoly policy concept shows a response to the following question made to business leaders: ¿is the anti-monopoly policy in your country lax and not effective at promoting competition or effective and promotes competition? It ranges from 1(low) - 7(high).	WB-DBI
Independent variables	Governance indicators	GI	Political Stability/no violence index (t-1)	Reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. The estimate ranges from -2.5 (weak) to 2.5 (strong performance).	WB-WGI
			Control of corruption index (t-1)	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. The estimate ranges from -2.5 (weak) to 2.5 (strong performance).	WB-WGI
	Social Indicators	SI	High education indicator	Product of the quantity of education index (gross secondary and terciary education enrollment rate) and quality of education index (index built on the answer to How well does the educational system in your country meet the needs of a competitive economy? and perception on the internet access in schools 1 = not well at all; 7 = very well).	WEF-GCR
			Health index	This is a composite index that is elaborated taking into account the business impact of malaria, malaria incidence, business impact of tuberculosis, tuberculosis incidence, business impact of HIV/AIDS, HIV prevalence, infant mortality, and life expectancy. It ranges from 1(low) - 7 (high). It ranges from 1(low) - 7 (high).	WEF-GCR
			Urban population (t-1)	Urban population as percentege of total population (given for one lagged year)	WB-WDI
	Macroeconomic Indicators	MI	Macroeconomic stability (Macroec. environment index)	This is a composite index that is elaborated taking into account the government budget balance, national savings rate, inflation, interest rate spread, government debt and country credit rating. It ranges from 1(low) - 7 (high).	WEF-GCR
			Financial markets development	This is a composite index that is elaborated taking into account the availability and affordability of financial services, financing through local equity market, ease of access to loans, venture capital availability and restriction on capital flows, and trustworthiness and confidence in the market. It ranges from 1(low) - 7 (high).	WEF-GCR
	Regional dummy	RD	Region of location	Dummies for continents LatinAmerica, Europe, Africa &Middle East, Asia&Oceania	WB
	Market size	Size	Log of GDP	Gross domestic product , current prices (USD)	IMF-WEO

	Variables	Label	Indicators	Definition/Measure	Source
Independent variables	Institutional quality	Inst	Rule of law index (t-1)	Reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. The estimate ranges from -2.5 (weak) to 2.5 (strong performance).	WB-WGI
			Property Rights Protection	Perception index constructed from the answer to the question: How would you rate the protection of property rights, including financial assets, in your country? It ranges from 1(very weak) to 7(very strong)	WEF-GCR
	Market mobility barriers	MM	Market entry barriers (Starting a business indicators)	Number of procedures Time (days) Cost (% of income per capita) Entry=Time*Cost	WB-DBI
			Market exit barriers (Resolving insolvency/Closing a business indicators)	Time (years) Cost (% of estate) Recovery rate (cents on the dollar) Exit=Time*Cost	WB-DBI
	Infrastructure facilities availability and quality	IA	Infrastructure index	Composite index that accounts for quality perception of transport infrastructure and public utilities (Energy and telecommunications) and extensiveness or availability of them nationwide. It ranges from 1 (poor) to 7 (best)	WB-DBI
	Information difussion	ID	Internet users	Percentage of individuals using the Internet	WEF-GCR
			Mobile telephone subscriptions	Number of mobile cellular telephone subscriptions per 100 population	
	Quality of demand	QD	Quality of demand conditions	Composite index that accounts for buyer sophistication (response to how do buyers make purchasing decisions in your country? (1 = based solely on the lowest price; 7 = based on a sophisticated analysis of performance attributes)) and customer orientation (How well do companies in your country treat customers?). It ranges from 1(low) - 7 (high).	WB-DBI
	External competition	EC	Openess to trade	Imports plus export as percent of GDP	WB-DBI
	Market concentration	MC	Extent of market dominance	Perception index constructed from the answer to the question:How would you characterize corporate activity in your country? (1 = dominated by a few business groups; 7 = spread among many firms)	WB-DBI
	Government Effectiveness	GE	Government Effectiveness index	Reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The estimate ranges from -2.5 (weak) to 2.5 (strong performance).	WB-WGI
			Property rights protection index	Perception index constructed from the answer to the question: How would you rate the protection of property rights, including financial assets, in your country? (1 = very weak; 7 = very strong)	WEF-GCR
	Experience with Competition Law	ExpCL	Years since Compeition Law enactment	Number of years since the date of the first Competition Law enactment	GCF

Sources: 1/ International Monetary Fund, World Economic Outlook Database (WEO), 2/ World Bank, statistics database (WDI), 3/ World Bank and CIA Factbook, 4/ Global Competition Forum (GCF) 5/ Global Competitiveness Report of World Economic Forum (WEF-GCR), 6/ World Bank – Governance indicators (GCI), and 7/ World Bank – Doing Business Report (DBI)

Table A.2. Main descriptive statistics by income group

Variable	Low income group (G1)				Lower middle income group (G2)				Upper middle income group (G3)				High income group (G4)			
	Mean	Median	Standard deviation	N° obs	Mean	Median	Standard deviation	N° obs	Mean	Median	Standard	N° obs	Mean	Median	Standard deviation	N° obs
GDP pcppp (USD)	1617.54	1568.91	684.64	244	5884.53	5616.64	1831.20	245	14681.12	13469.31	4643.42	246	38459.01	35810.74	12704.02	244
GDP (billion USD)	39.84	9.08	134.86	252	207.68	27.53	776.77	245	233.47	67.68	383.60	246	1147.76	319.20	2477.72	244
Intensity of local competition index	4.31	4.35	0.60	214	4.57	4.58	0.58	215	4.84	4.90	0.57	228	5.50	5.57	0.40	240
Policital stability	-0.73	-0.59	0.81	252	-0.48	-0.51	0.63	245	0.16	0.36	0.76	244	0.76	0.94	0.58	244
Control of corruption	-0.73	-0.73	0.40	252	-0.46	-0.49	0.40	245	0.11	0.08	0.66	245	1.42	1.51	0.73	244
Education*	7.28	6.29	3.47	214	13.52	12.91	4.19	215	20.01	19.36	4.77	228	28.28	29.54	5.99	240
Urban population (%)	31.45	28.94	12.54	252	53.77	55.34	14.63	245	68.53	67.83	13.86	246	79.89	80.50	12.31	237
Health index	4.69	4.61	0.98	214	6.18	6.33	0.59	215	6.41	6.61	0.72	228	6.86	6.89	0.11	240
Macroeconomic environment	4.14	4.28	0.79	214	4.59	4.62	0.76	215	4.83	4.88	0.61	228	5.34	5.39	0.67	240
Financial market development	3.64	3.61	0.60	214	3.85	3.86	0.49	215	4.34	4.31	0.58	228	5.06	5.13	0.63	240
Total population (Millions)	49.45	13.94	149.49	244	75.95	9.63	255.44	245	27.29	8.98	42.52	239	28.62	7.46	55.27	244
Regulatory quality	-0.61	-0.52	0.45	252	-0.28	-0.27	0.41	245	0.38	0.46	0.70	245	1.30	1.39	0.45	244
Property Rights Index	3.70	3.69	0.65	214	3.99	3.90	0.79	215	4.51	4.60	0.87	228	5.76	5.90	0.61	240
Effectiveness of anti-monopoly policy index	3.48	3.44	0.50	214	3.49	3.47	0.65	215	3.95	3.95	0.65	228	5.02	5.17	0.67	240

Variable	Low income group (G1)				Lower middle income group (G2)				Upper middle income group (G3)				High income group (G4)			
	Mean	Median	Standard deviation	N° obs	Mean	Median	Standard deviation	N° obs	Mean	Median	Standard	N° obs	Mean	Median	Standard deviation	N° obs
Entry costs (days*costs)	8769.52	2517.50	40371.32	249	5435.50	1090.20	17833.34	241	591.28	205.95	1019.44	230	181.43	44.80	410.11	231
Exit costs (years*costs)	65.55	60.00	47.08	235	55.42	35.10	49.40	235	42.75	34.50	29.44	230	19.60	9.60	31.73	230
Infrastructure facilities index	2.55	2.50	0.50	214	3.27	3.25	0.74	215	3.88	3.86	0.72	228	5.42	5.57	0.72	240
Internet users (percentage)	5.37	2.33	7.76	214	14.21	10.00	11.81	215	32.31	30.40	18.70	227	57.46	56.73	19.77	240
Mobile telephone subscriptions/100 pop	27.42	17.16	29.00	214	54.54	47.33	35.14	214	86.43	84.63	38.72	228	106.09	103.48	27.65	240
Quality of demand conditions	3.49	3.48	0.47	214	3.86	3.79	0.53	215	4.14	4.14	0.42	228	5.08	5.07	0.52	240
Openess to trade**	79.36	71.41	35.15	230	88.31	81.41	31.22	233	95.90	88.97	40.96	241	113.43	89.71	90.40	231
Extent of market dominance index	3.34	3.27	0.55	214	3.38	3.28	0.63	215	3.72	3.69	0.57	228	4.77	4.84	0.76	240
Government effectiveness index	-0.71	-0.72	0.39	252	-0.34	-0.37	0.39	245	0.32	0.32	0.59	245	1.41	1.57	0.58	244
Experience with Competition Law (years)	11.84	12.00	8.77	174	10.88	9.00	8.61	184	12.75	14.00	6.76	223	27.94	20.00	23.67	215

(*) Education=High education quantity * High education quality index

(**) Openness to trade=(exports+imports)/GDP

The income group classification was done on the basis of the quartile cut-off values of the GDP pc pp distribution for each year. Countries with income that lies within the first quartile were classified as low income country.

Sources: 1/ International Monetary Fund, World Economic Outlook Database (WEO), 2/ World Bank, statistics database (WDI), 3/ World Bank and CIA Factbook, 4/ Global Competition Forum (GCF) 5/ Global Competitiveness Report of World Economic Forum (WEF-GCR), 6/ World Bank – Governance indicators (GCI), and 7/ World Bank – Doing Business Report (DBI)

Table A3. Estimation results of the Development equation

Variable	(1) Pooled IV	(2) Fixed Effects	(3) Between Effects	(4) Fixed Effects IV	(5) Fixed Effects 2-Step-GMM
Intensity of local competition	0.163*** (0.054)	0.005 (0.009)	0.001 (0.108)	0.011 (0.017)	0.011 (0.017)
Political stability	0.137*** (0.025)	0.053*** (0.010)	0.150** (0.071)	0.049*** (0.010)	0.049*** (0.010)
Control of corruption	0.127*** (0.034)	0.030* (0.015)	0.049 (0.100)	0.024 (0.016)	0.024 (0.016)
Education	0.013*** (0.004)	0.002 (0.001)	0.029** (0.012)	0.003** (0.001)	0.003** (0.001)
Urban population	0.016*** (0.001)	0.011*** (0.003)	0.012*** (0.003)	0.010*** (0.003)	0.010*** (0.003)
Health	0.306*** (0.026)	0.007 (0.012)	0.298*** (0.072)	0.016 (0.012)	0.016 (0.012)
Macroeconomic environment	0.190*** (0.022)	0.028*** (0.005)	0.281*** (0.068)	0.029*** (0.006)	0.029*** (0.006)
Financial market development	0.113*** (0.037)	0.063*** (0.008)	0.237** (0.107)	0.063*** (0.008)	0.063*** (0.008)
Intercept	4.012*** (0.240)	7.778*** (0.205)	4.342*** (1.508)		
R^2	0.890	0.776	0.886	0.789	0.789
Adjusted R^2	0.887	0.729	0.870	0.744	0.744
Root mean squared error	0.398	0.049	0.446	0.047	0.047
F-statistic	357.123	180.493	55.145	178.764	178.764
LogLikelihood		1487.328	-75.317	1392.203	1392.203
N obs.	814	882	882	811	811

[1] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

[2] Standard errors are given in parentheses.

[3] Regional dummies (Africa, Europe, LAC and Asia&Oceania) are considered in regressions (1) and (3).

[4] Columns (1), (4) – (7) use the first set of instruments as mentioned in section 5.3

Table A4. Estimation results of the Competition Intensity equation

Variable	(1) Pooled IV	(2) Fixed Effects	(3) Between Effects	(4) Fixed Effects IV	(5) Fixed Effects 2-Step-GMM
Log of GDP	0.103***	-0.011	0.042*	0.539***	0.539***
	(0.019)	(0.069)	(0.025)	(0.204)	(0.204)
Rule of law	0.082**	0.078	0.019	0.094	0.094
	(0.036)	(0.076)	(0.094)	(0.079)	(0.079)
Property rights protection	0.147***	0.039	0.132	0.022	0.022
	(0.033)	(0.033)	(0.090)	(0.035)	(0.035)
Effectiveness of anti-monopoly policy index	0.206***	0.168***	0.204**	0.135***	0.135***
	(0.034)	(0.039)	(0.091)	(0.042)	(0.042)
Entry costs	0.000	0.000	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Exit costs	0.000	-0.001	0.001	0.000	0.000
	(0.000)	(0.001)	(0.001)	(0.002)	(0.002)
Infrastructure facilities and quality	-0.086***	-0.075**	-0.053	-0.054	-0.054
	(0.029)	(0.032)	(0.071)	(0.034)	(0.034)
Internet users	-0.004***	0.001	-0.005	0.002	0.002
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)
Mobile phone subscriptions	0.001	0.000	0.001	-0.001**	-0.001**
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Quality of demand conditions	0.255***	0.347***	0.347***	0.279***	0.279***
	(0.041)	(0.043)	(0.100)	(0.050)	(0.050)
Openess to trade	0.001***	0.003***	0.000	0.004***	0.004***
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Extent of market dominance	0.051*	0.089***	0.131*	0.116***	0.116***
	(0.030)	(0.032)	(0.073)	(0.035)	(0.035)
Intercept	1 797***	2.172***	1.101*		
	(0.137)	(0.324)	(0.636)		
R^2	0.773	0.412	0.827	0.356	0.356
Adjusted R^2	0.768	0.281	0.799	0.214	0.214
Root mean squared error	0.329	0.185	0.292	0.191	0.191
F-statistic	151.691	26.023	29.954	24.126	24.126
LogLikelihood		301.9	-14.693	261.998	261.998
N obs.	819	819	819	816	816

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.
[2/] Standard errors are given in parentheses.
[3/] Columns (1), (4) – (7) use the first set of instruments as mentioned in section 5.3

Table A5. Estimation results of the Competition law effectiveness equation

Variable	(1) Pooled OLS	(2) Fixed Effects	(3) Between Effects	(4) Two-way Fixed Effects	(5) Between Effects with Time dummies
Government effectiveness	0.273*** (0.034)	0.254*** (0.081)	0.263*** (0.079)	0.224*** (0.082)	0.258*** (0.084)
Property rights protection	0.422*** (0.028)	0.381*** (0.036)	0.423*** (0.067)	0.439*** (0.039)	0.427*** (0.071)
Experience with Competition Law	0.021*** (0.002)	0.067*** (0.007)	0.019*** (0.005)	0.067*** (0.007)	0.019*** (0.006)
Experience squared	-0.000*** (0.000)	-0.001*** (0.000)	-0.000** (0.000)	-0.001*** (0.000)	-0.000* (0.000)
Intercept	1 790*** (0.125)	1.698*** (0.207)	1.817*** (0.297)	1.436*** (0.217)	2.297** (1.008)
Time effects	No	No	No	Yes	Yes
R^2	0.780	0.275	0.820	0.299	0.823
Adjusted R^2	0.778	0.130	0.814	0.153	0.807
Root mean squared error	0.418	0.237	0.364	0.234	0.371
F-statistic	663.107	59.534	133.029	29.535	51.511
LogLikelihood	-410.497	85.512	-47.377	98.269	-46.366
N obs.	755	755	755	755	755

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.
[2/] Standard errors are given in parentheses.

Table A6. Summary of statistics for overidentifying restriction test and weak instruments test Development equation (First set of instruments used)

	Includes standard errors (spherical errors assumed)			Includes robust/clustered standard errors		
	Pooled IV	Fixed Effects IV	FE 2-step GMM	Pooled IV	Fixed Effects IV	FE 2-step GMM
Overidentifying restrictions test						
Sargan statistic Chi2	177.719	49.880	49.880			
p-value	0.000	0.000	0.000			
Hansen's J Chi2				34.586	13.976	13.976
p-value				0.000	0.174	0.174
Weak instrument test for Intensity of competition						
First stage regression Partial R^2	0.4087			0.4087		
F statistic	49.320***	21.770***	21.770***	49.320***	10.380***	10.380***
Instrumented variable		ICL			ICL	
Instrument variables	inst, EAP, MM, IA, ID, QD, EC, MC			inst, EAP, MM, IA, ID, QD, EC, MC		

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

Table A7. Summary of statistics for overidentifying restriction test and weak instruments test
Development equation
(Second set of instruments used)

		Includes standard errors (spherical errors assumed)			Includes robust/clustered standard errors		
		Pooled IV	Fixed Effects IV	FE 2-step GMM	Pooled IV	Fixed Effects IV	FE 2-step GMM
Overidentifying restrictions test							
Sargan statistic Chi2		3.057	0.002	0.002			
	p-value	0.080	0.962	0.962			
Hansen's J Chi2					1.043	0.001	0.001
	p-value				0.307	0.975	0.975
Weak instrument test for Intensity of competition							
First stage	Partial R^2	0.368			0.368		
regression	F statistic	209.890***	49.020***	49.020***	209.890***	13.480***	13.480***
Instrumented variable			ICL			ICL	
Instrument variables			Effectiveness of anti-monopoly policy and squared experience with comp. law			Effectiveness of anti-monopoly policy and squared experience with comp. law	

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

Table A8. Summary of statistics for overidentifying restriction test and weak instruments test
Competition intensity equation
(First set of instruments used)

		Includes standard errors (spherical errors assumed)			Includes robust/clustered standard errors		
		Pooled IV	Fixed Effects IV	FE 2-step GMM	Pooled IV	Fixed Effects IV	FE 2-step GMM
Overidentifying restrictions test							
Sargan statistic Chi2		84.384	17.865	17.865			
	p-value	0.000	0.007	0.007			
Hansen's J Chi2					26.391	8.542	8.542
	p-value				0.003	0.201	0.201
Weak instrument test for Intensity of competition							
First stage	Partial R^2	0.2666			0.2666		
regression	F statistic	26.110***	13.040***	13.040***	26.110***	5.940***	5.940***
Instrumented variable			market size (log of GDP)			market size (log of GDP)	
Instrument variables			GI, SI, MI			GI, SI, MI	

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

Table A9. Summary of statistics for overidentifying restriction test and weak instruments test
Competition intensity equation
(Second set of instruments used)

		Includes standard errors (spherical errors assumed)			Includes robust/clustered standard errors		
		Pooled IV	Fixed Effects IV	FE 2-step GMM	Pooled IV	Fixed Effects IV	FE 2-step GMM
Overidentifying restrictions test							
Sargan statistic Chi2		35.089	5.674	5.674			
	p-value	0.000	0.129	0.129			
Hansen's J Chi2					10.493	2.473	2.473
	p-value				0.015	0.480	0.480
Weak instrument test for Intensity of competition							
First stage regression	Partial R^2	0.7742			0.7742		
	F statistic	528.790***	17.870***	17.870***	528.790***	8.050***	8.050***
Instrumented variable		market size (log of GDP)			market size (log of GDP)		
Instrument variables		log of energy consump. pc, pop., political staibility, financial market development			log of energy consump. pc, pop., political staibility, financial market development		

[1/] ***, **, * denotes statistical significance at 1%, 5% and 10% level respectively.

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