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**Inequality in developing economies: The role
of institutional development**

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Inequality in developing economies: The role of institutional development*

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Abstract

In the present paper we study the distributive impact of institutional change in developing countries. In such economies, economic institutions, such as property rights systems, may act to preserve the interests of a rich minority, but this depends crucially on the level of political equality. For example, dominant classes can control key-markets, access to assets and investment opportunities, especially if they enjoy disproportionate political power. We test this hypothesis using cross-section and panel data methods on a sample of low- and middle-income economies from Africa, Asia and Latin America. Results suggest that: (a) increasing the protection of property rights increases income inequality; (b) such an effect is larger in low-democracy environments; (c) a minority of countries have developed a set political institutions capable of counterbalancing this effect.

Keywords: Inequality, developing economies, institutions, property rights, democracy
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1. Introduction

The distribution of resources and the rules that govern the economy are central to economic development. Western economies have long undergone economic and political transformations that have delivered a high level of income per capita and nearly uniform levels of socially-acceptable income inequality. In developing economies, instead, economic performance reflect institutional arrangements – created in colonial times and inherited by postcolonial states – that were ill-suited for development. Acemoglu, Johnson and Robinson (2005) summarise this research: they trace the primary cause of economic backwardness to the way economic and political institutions in developing economies function. Similarly, Besley and Ghatak (2009) emphasise the importance of property rights. However, while the effects of institutions on national income have been extensively researched, their distributional impact has not received adequate consideration so far.

An assessment of this impact is particularly relevant for developing economies. Indeed, a steady concentration of income is often one of the main characteristics of these economies. Moreover, they have recently started further institutional reforms, which is an ongoing process. From the political point of view, an increasing number of countries have tried to move away from authoritarian politics and unaccountable governments and started experimenting with forms of procedural democracy. Especially in the post Cold War era when electoral competition was introduced. On the economic front, production and exchange have mimicked those of richer economies, such as increased privatisation and deregulation. These reforms and the way they relate to historical institutional structures must have an impact on efficiency. But what are the effects on equity? We do not know a great deal about the distributional consequences of institutional change.

Principles of economics of inequality suggest that the possibility of acquiring factors of production, the right to any benefit from them and initial endowment (as well as ability to increase one's marginal productivity) determine each person's amount of income (see Champernowne and Cowell, 1998). Institutional and political processes affect this amount because they mould the individual's incentives and constraints the range of activities they can undertake. Such processes set the rules that shape property relations and, consequently, the rewards each production factor receives. Institutions affect taxation, wage-setting policies, strategies that promote or hinder the acquisition of skills among different sectors of the population and access into markets. Ultimately, all these elements relate to agents' capability to earn and appropriate income from the production factors they own, i.e. property rights

regimes. We refer to this set of economic institutions as the rules, both formal and informal, defining and protecting private property which enhance the ability to appropriate returns from ownership and use of factors of production.

In this paper we use both cross-section and panel data methods to investigate empirically the effect of property rights on income inequality in developing countries. Such institutions can exacerbate inequality if they are conceived to preserve or increase the economic and political interests of privileged minorities. For instance, one's property rights can also be protected by weakening the risk of expropriation of productive assets via controlling the political system, by erecting barriers to entry, or by setting favourable tax regimes, as well as engaging in rent-seeking activities (see Acemoglu, 2008). In all these cases, the resulting property rights may be inequitable. Unlike previous literature, we account for the interaction between political and economic institutions. In particular, we highlight that a situation where property relations are inequitable is more likely to occur in environments where political power is disproportionately allocated to oligarchies. In developing economies, an undemocratic power structure could prevent such economies from building an institutional apparatus that can alleviate the concentration of income. These phenomena could be prominent in many ex-colonies, where economic institutions could have led to high and persistent inequality.

An assessment of the impact of economic institutions on income inequality is useful to understand reforms aimed at creating investment incentives or at extending the economic opportunities of low-income groups (for example, access to and control of factors of production and assets or workers' right to organise and bargain). The paper also provides novel evidence on the relationship between political systems and economic inequality. The standard argument would suggest that democratic politics may increase redistributive expenditure. Democratisation, instead, could affect the level of income inequality 'indirectly' by changing the functioning of property rights systems.

This is consistent with recent literature on the determinants of inequality. Bourguignon et al. (2007, pp.250-253) call for a systematic analysis of the effect of institutions, in the current and future research agenda on the persistence of inequality. Bowles (2004) has coined the expression "institutional poverty traps" to refer to institutional arrangements that engender inequality.² This paper also deals with the debate relating to the evolution of inequality during the process of development. A perennial question in the study of income inequality is:

² The role of institutions is emphasised also by Atkinson (1997), stressing the role of social customs and norms.

are there any factors that lead inequality to describe an inverted-U pattern as output increases (see, for example, Milanovic, 2000)? Recent literature suggests that the actual trajectory of inequality could depend on institutional arrangements adopted by governments, which distribute the gains of economic growth across the population (Acemoglu and Robinson, 2002; Piketty, 2006).³ Finally, the paper contributes to the broader literature which investigates the determinants of income distribution within and across countries, as suggested by Atkinson (1997). For example, cross-national studies have emphasised the role of democratisation, financial development and education (Li, Squire and Zou, 1998) and, recently, the role of colonialism (Angeles, 2007) and factor rewards, especially labour's share (Daudey and García-Peñalosa, 2007).

The paper is structured as follows. In section 2 we discuss the hypotheses to be investigated empirically. Section 3 formulates the empirical model to be tested and we also introduce the data used. The results are presented in section 4. The final section summarises and discuss the implications of the empirical results.

2. Inequality and institutions: theoretical and empirical issues

2.1 Theoretical issues

Does improved property rights protection increase or decrease inequality? In principle, the effect could take either sign. We should know in whose favour such rules work or whose property rights are protected. Some literature outlines the following causal mechanism. The presence and exploitation of factor endowments in many colonial economies, such as labour abundance, natural resources and soil suitability for cash crops with substantial economies of scale, explain extreme level of historical inequality in income, human capital and political power. Such historical conditions allowed colonial elites to establish an institutional framework that secured the investment returns for the few, so reinforcing income inequality over time. This state of affairs did not change after the end of colonialism. Hence, the functioning of laws pertaining to property rights and economic relationships, since independence, contribute to the persistence of inequality. Angeles (2007) shows that the presence of a European minority is associated with production systems aimed at exploiting native populations (and is a robust predictor of current income inequality in pooled OLS

³ Acemoglu and Robinson (2002) formalised the idea that inequality could be the result of institutional transformation which encourage redistribution and is forced by the threat of social unrest. Sustained social mobilisation channelled Western economies on an inverted-U pattern, while some economies in sub-Saharan Africa and Latin America have experienced an 'autocratic disaster'.

regressions). For example, in South Africa, the British and Afrikaners dominated the agricultural and mining resources prohibiting the acquisition of land by natives (and political power passed to European descendants following independence). Jolly (2006) observes that in developing economies inequalities of landholdings, mine or forest resources are high because at the time of independence constitutions often prevent property disputes (or only allow this if there is to be a full compensation). In other cases, property rights (for example, mining royalties) have been allocated either through political connections or even by subverting the political system (such as, mounting a coup). Engerman and Sokoloff (2005) went further to document how certain forms of inequitable institutions arose in many Latin American and sub-Saharan African economies. In order to exploit their natural resources, labour abundance and soil fertility, colonisers established exploitative institutions in many areas of Latin America and the Caribbean. Property relations created and perpetuated the concentration of income and wealth in economies that were rich in minerals or had suitable soil for large-plantation commodities for the production of cash crops (e.g. sugar, coffee, and bananas) using forced labour. Examples of these are found in Brazil, El Salvador, Guatemala and the Caribbean islands, but also Mexico, Peru and Bolivia.⁴ Morrisson (2006) has showed that the existence of dualistic structures in colonial and postcolonial Senegal and Kenya has kept inequality high, while Ghana had taxation and labour market structures such that inequality was low. In some other areas of sub-Saharan Africa, the functioning of agricultural markets and the extraction of natural resources was distorted in the favour specific groups, primarily the political and economic elites and their clients in the urban areas. Small-scale farmers were 'expropriated' of their crops which were sold at prices below the market level through state marketing boards, to whom they were compelled to sell (Bates, 1988). The presence of natural wealth, whether controlled by a state-owned or private enterprise, co-exists with systems that extract rents (Milanovic, 2003).⁵

Following this literature, the access to and the reward of production factors were

⁴ This also created societies where political power ensured the elite had a disproportionate influence on the economy. The share of the voting population in the region has historically been very low, franchise was granted under wealth and literacy requirements, and lack of secrecy of vote was also a recurring feature of political systems (Engerman and Sokoloff, 2005).

⁵ Such phenomena may not be so pervasive in south and east Asia (quite exceptional is the case of Taiwan and South Korea, where land education inequality decreased substantially). Acemoglu and Robinson (2002) define 'East Asian miracle' phenomena of 'growth with equity' in Asia (as opposed to the 'growth with inequality' in Latin America and the recent increase in economic inequality in Western Countries, e.g. Britain and USA). Bardhan (2005) observes that cultural values in India and China translated in formal and informal rules that made such societies relatively more egalitarian (e.g., the absence of law of primogeniture has contributed to keep low land inequality). Perhaps not negligible is also East Asia's reduced importance of cash crops and mineral resources, exceptions being plantation economies such as Sri Lanka and The Philippines.

created to protect the interests of an influential minority. Hence, we are going to test the hypothesis that property rights regimes contributed to increase inequality. Before turning to this, we have to discuss the role of political systems and their interplay with economic rules.

Extending the franchise is expected to deliver a reduction in inequality. If the median voter shifts the income distribution below the mean income one should expect higher taxation, and more redistributive policies. The amount will be proportional to the level of inequality prior to democratisation, that is the initial number of poor. Yet, such mechanisms are not consistent with the experiences of developing economies. In fact, econometric evidence does not find a robust correlation between the two variables (see, for a recent review, Gradstein and Milanovic, 2004). Are there any other types of redistributive effects? The redistributive role of democratisation could be 'indirect', rather than directly through public expenditure. Here, we consider and test the idea that a democratic political system could be a necessary condition to change property relations either weakening the property rights of the elite or strengthening the property rights of the poor. Examples of this could cover wage-setting policies to regulating entry into markets. Rodrik (1999) and Robinson (2001) have argued, and provided evidence, that democracies redistribute by increasing the wages share through reforms of labour market institutions; e.g. workers have the right to organise in order to increase their bargaining power, there are higher minimum wages and more favourable hiring and firing practices. Acemoglu (2008) has suggested that the form that property rights in democratic environments works differently than in oligarchic ones. In the latter the dominant economic elite has enough political power to control key-markets by erecting entry barriers (e.g. through direct regulation, but also obtaining subsidised credit or inputs) as well as protecting themselves from expropriation and from redistributive taxation and thus protecting their own property rights. Unlike democratic societies, oligarchic societies provide limited access to property rights and worse distributional outcomes. Developing economies might have, in most cases, established property rights that reflect the unequal balance of political power. If this is the case, economic inequality is also explained by the interplay of political and economic institutions. Economic institutions grant narrow or broad access to property rights according to the degree of inclusiveness of the political system. Hence, the distributional effects of property rights can be different at different stages of democratisation.

2.3 Empirical literature

Cross-national investigations on the determinants of economic inequality in developing countries are sparse (an exception is Milanovic, 2003) and the role of economic

institutions has not been systematically addressed. Perhaps this is, in part, due to the limited availability of inequality data in developing economies. There are, however, few recent studies that consider the distributive impact of institutions in the broader geographical context. The first test was provided in Chong and Calderon (2000), taking a cross-sectional approach. With a sample covering 70 developed as well as developing countries, results show that institutional quality measured by a composite index based on political risk data by *International Country Risk Guide* (ICRG) and the *Business Environmental Risk Intelligence* (BERI)⁶, displays a quadratic relationship with income inequality. For poor economies institutional quality is positively linked with income inequality, but the inverse holds for rich economies. Another cross-section study, on the other hand, finds a statistically insignificant impact for institutions with OLS regressions using a linear specification (Sylwester, 2004).⁷ Chong and Gradstein (2007) study, using a panel of more than 100 countries and controlling for unobserved heterogeneity, the correlation between income inequality and a number of institutional indicators, capturing democratic and institutional stability aspects, and find evidence for ‘better’ institutions reducing income inequality.⁸ Similarly, Carmignani (forthcoming), estimating a system aimed at explaining the amount of redistribution (in a panel of countries), finds that weaker institutions (measured also with a *property rights* index) also have a distributional impact, raising income inequality.

Empirical research is limited and has tended to treat institutions as an indistinct body, while it could be insightful to disentangle the impact of political and economic institutions. Political systems have a distinct role from economic institutions. Democracy can directly affect economic inequality but it also moulds economic institutions by including or excluding the citizens from the political process which builds economic systems. Hence, property rights issues could be linked to the nature of the political regime. While in developed economies institutions are stable and consolidated, in less developed economies institutional failures are by far more frequent and extensive. After all, the issue of institutional reform, especially property rights clarity, is high on the agenda of development scholars and policy makers alike. Here, at least in part, we intend to fill these gaps.

⁶ From ICRG: (i) ‘risk of expropriation’; (ii) ‘repudiation of contracts by government’; (iii) ‘law and order tradition’; (iv) ‘corruption in government’; and (v) ‘quality of bureaucracy’. From BERI: (i) ‘contract enforceability’; (ii) ‘nationalization potential’; (iii) ‘bureaucratic delays’; and (iv) ‘infrastructure quality’.

⁷ On a sample of ex-colonies (including USA, Canada, Australia and New Zealand), and using a composite index of institutional development (consisting of political rights and civil liberties, political stability, government effectiveness, limits to government regulation and adherence to the rule of law).

⁸ They use Freedom House political rights and civil liberties indices; and ‘rule of law’, ‘corruption’, ‘government stability’, ‘bureaucratic quality’ and ‘democratic accountability’ from ICRG.

3. Methodology and data

Regressions based on cross-section averages can be a suitable tool to test relationships whose mechanisms are long run characteristics, as argued in Easterly (2007).⁹ In this case, how political and institutional development contributed to present-day inequalities (e.g. post-colonial, or even colonial, history). Hence, an empirical counterpart to the foregoing ideas can take the following functional form:

$$Ineq_{i,T,T-1} = \beta_0 + \beta_1 \cdot I_{i,t,t-1} + \beta_2 \cdot Q_{i,t,t-1} + X'_{i,t,t-1} \cdot \phi + \varepsilon_{i,t,t-1} \quad (1)$$

Where, $Ineq_{i,T,T-1}$ is the average inequality index of interest for country i between the end of the sample period, T , and $T-1$. $Q_{i,t,t-1}$ is a measure of economic institutions, i.e. clarity of property rights, for country i between times t and $t-1$, with $t < T-1$. The choice of period attenuates problems of reverse causality that might cloud the inference about property rights. Similarly, the level of political democracy is $I_{i,t,t-1}$. In practice, a suitable response variable can be Gini coefficient measured as the average of the available observations from 1991 to the end of the sample period, while we use averages of democracy and of the available observations of the property rights rating. The coefficient β_1 and β_2 can be interpreted, respectively, as the long run effect of democratic and property rights consolidation on income inequality.

$X_{i,t,t-1}$ is a set (kx1 vector) of controls. Following Li, Squire and Zou (1998), we control for education, land inequality and the level of financial development (a set of inequality determinants whose effects, as we shall test, could also be depending on the level of democratisation). The average level of education provides a greater supply of skilled labour, which tends to reduce the skill premium and hence reduces inequality in the distribution of labour incomes. Land inequality and the level of financial development are capturing assets inequality: how difficult it is to access credit for the poor, lacking collaterals. We also control for regional dummies, to capture unobserved regional effects; other long-run determinants of inequality, which include the level economic development – measured by GDP per capita, to capture economy-size effects – and its square, to capture Kuznets curve-type effects; and inflation, which hits the poor harder, as they are normally unable to hedge against it. Equation (1) also conditions on the suitability of land for wheat versus sugarcane, which, as elaborated by Easterly (2007), is exogenous and picks the historical variation of inequality. Finally, $\varepsilon_{i,t,t-1}$ is the error, capturing all other omitted factors.

⁹ Contributions following this strategy are Chong and Calderon (2000) and Daudey and García-Peñalosa (2007).

Following from the foregoing discussion, inequality can be modelled allowing for interaction effects:

$$Ineq_{i,T,T-1} = \beta_0 + \beta_1 \cdot I_{i,t,t-1} + \beta_2 \cdot Q_{i,t,t-1} + \beta_3 \cdot (Q_{i,t,t-1} \cdot I_{i,t,t-1}) + X'_{i,t,t-1} \cdot \phi + \varepsilon_{i,t,t-1} \quad (2)$$

Equation (2) admits that the estimated parameters can be heterogeneous across the population, and interaction terms are one way to account for that. Hence, the partial effect of property rights institutions is now conditional on democratic consolidation: $\partial Ineq / \partial Q = \beta_2 + \beta_3 \cdot I_{i,t,t-1}$. In particular, β_2 is the impact of one unit change in property rights institutions on income inequality when democracy is zero. We expect that stronger property rights protection increases income inequality, β_2 is positive. Such effect is moderated by increased democratisation as this process modifies the functioning of property rights; therefore, β_3 is expected to take a negative sign. However, from estimating (2) alone we cannot observe if economic institutions have a significant effect on inequality when democracy is not zero, although all these cases can be very informative. Thus, for a full interpretation of the partial effects, we have to plug in the values of democracy and then recalculate standard errors and significance of the resulting marginal effect.

Relying on the cross-section approach – as in (1) and (2) – would enable us to tell which countries adopt inequitable economic institutions based on choices on the political structure rooted in (recent) history. And it is consistent with the literature, which tries to explain long run phenomena. The potential consequence of averaging the variables over years is that it tends to obscure episodes of political and institutional change within countries which should be reflected in a subsequent change in the distribution of resources. For example, such approach does not capture the likely effects of episodes of political reforms towards democratisation over time or, vice versa, of reversions to authoritarianism (e.g. some Latin American nations). If this is the case, one could complement the evidence from cross-section regressions based on averages with a panel approach, as it can validate such results if we concentrate on the *within* variation. A causal link between property rights and inequality suggests that we should also see a relationship between changes in property rights and changes in income inequality. Put it differently, we should be able to ask: does income concentration (with its other characteristics held constant) become higher *when* its legal system increase private property protection? To answer such question one has to investigate whether the cross-sectional relationship between the variables of interest disappears when country fixed effects are included in the regression, thus removing the long-run determinants of both property rights protection and inequality that are time-invariant. Furthermore, we can minimise the confounding effect of omitted variables by controlling for common trends, e.g.

the decades since the late 1970s have witnessed world-wide economic and political shocks.

In practice, such approach could not be as effective as expected. The causal mechanisms, and the variables under scrutiny, have long run features and evolve slowly over time. The available data structure, as we shall discuss below, is not the best-suited for this type of analysis. The time dimension of the available panel of developing economies is such that, while property rights and democracy show enough variability over time, inequality tends to change a lot across countries, but little over time. Hence, procedures that remove the effects of time invariant factors also remove most of the variation the one wants to explain. Notwithstanding, we attempt to investigate the short run behaviour of the relationships under scrutiny by exploiting *within* country variation, even though, as we shall argue, results should be treated with caution. This requires estimating the relationships of interest using Fixed Effects (FE) estimator, which is entirely based on time-series variation (e.g. as captured by deviations from individual means, *Within estimator*).

3.1 Data

This study uses aggregate data at country level. The sample is composed of sixty-three developing countries (which are not transition economies), defined as low- and middle-income economies in South and Central America, sub-Saharan Africa, North Africa and the Middle East and Asia. The data appendix provides a list, divided by regions.

Our preferred measure of protection of private property rights is extracted from the *Index of Economic Freedom* of the Fraser Institute. In its recent denomination, *Legal Structure and Security of Property Rights* is a continuous variable ranging between 1 and 10; a higher score corresponds to a better protection of private property rights. As far as we are aware, it is available over a longest time span – having been recorded, every five years, from 1970 until 2000 (and every year from 2001 on) – also for a large number of developing economies. This makes it crucial to conduct panel data analysis. It is a *subjective* index: expresses experts' views – from the business community and academia – on how secure they consider investments to be in a given country, according to a number of dimensions (they do not tell us about the 'breadth' of private property rights – i.e. the allocation of such rights).¹⁰

¹⁰ It has been assembled over the years from different sources – essentially, but not exclusively, the International Country Risk Guide, the Business Environment Risk Intelligence, and the Global Competitiveness Report – and has undergone some changes in the definition, although the underlying concept stayed unchanged (see, for details, the various *Economic Freedom of the World Reports*, e.g. Gwartney and Lawson, 2007). It includes: (a) Judicial independence (from GCR): the judiciary is independent and not subject to interference by the government or parties in dispute (This component is from the *Global Competitiveness Report's* question: "Is the judiciary in your country independent from political influences of members of government, citizens, or firms?

As a democratisation measure, we utilise the database by Vanhanen (2000), which is a continuous variable – taking values greater or equal to zero – based on *objective* assessment. It is computed (by multiplying and dividing by 100) from equally weighting two indices: *competition* and *participation*.¹¹ It is a ‘parsimonious’ index, which captures few necessary attributes of procedural democracy. This feature is appealing, as makes the index free from judgment on the attributes that political democracy should have (e.g. some analysts consider a market-based economic system and protection of private property as defining attributes).

To measure income inequality, our preferred index is the Gini coefficient. Although UNU-WIDER (2007) offered a higher quality dataset, the World Income Inequality Database (WIID), one must address the well-known comparability problems that exist when using secondary datasets of income inequality. Hence, we had to select and adjust the available observations to make the observations as consistent as possible to obtain the *Gini coefficient of disposable household income*.¹²

No—heavily influenced (=1) or Yes—entirely independent (=7).” See World Economic Forum, *Global Competitiveness Report* (various issues), at <http://www.weforum.org/en/initiatives/gcp/index.htm>. (b) Impartial courts (from GCR): a trusted legal framework exists for private businesses to challenge the legality of government actions or regulation (this component is from the *Global Competitiveness Report*’s question: “The legal framework in your country for private businesses to settle disputes and challenge the legality of government actions and/or regulations is inefficient and subject to manipulation (=1) or is efficient and follows a clear, neutral process (=7).” (c) Protection of property rights (from GCR): this component is from the *Global Competitiveness Report*’s question: “Property rights, including over financial assets are poorly defined and not protected by law (=1) or are clearly defined and well protected by law (=7).” (d) Military interference in the rule of law and the political process (from ICRG); This component is based on the *International Country Risk Guide*’s Political Risk Component *Military in Politics*: “A measure of the military’s involvement in politics. Since the military is not elected, involvement, even at a peripheral level, diminishes democratic accountability. Military involvement in government might stem because of an actual or created internal or external threat. Such a situation would imply the distortion of government policy in order to meet this threat, for example by increasing the defence budget at the expense of other budget allocations. In some countries, the threat of military take-over can force an elected government to change policy or cause its replacement by another government more amenable to the military’s wishes. A military takeover or threat of a takeover may also represent a high risk if it is an indication that the government is unable to function effectively and that the country therefore has an uneasy environment for foreign businesses. A full-scale military regime poses the greatest risk. In the short term a military regime may provide a new stability and thus reduce business risks. However, in the longer term the risk will almost certainly rise, partly because the system of governance will be become corrupt and partly because the continuation of such a government is likely to create an armed opposition.” (e) Rule of law (from ICRG, see above): it is defined as *integrity of the legal system*, i.e. strength and impartiality of the legal system and popular observance of the law.

¹¹ *Competition* is calculated by subtracting the percentage of votes won by the largest party from 100 (i.e. the smaller parties’ share of the votes cast in parliamentary or presidential elections). If data on the distribution of votes are not available, this variable is calculated on the basis of the distribution of seats in parliament. *Participation* is calculated as the share of population that actually votes as a percentage of total population.

¹² From the version 2b of the WIID, we first delete all observations for which the underlying notion of income or earnings is unknown or incomplete (‘quality 4’ data, the lowest ranking), and thus we only use the top 3 rankings. To maximise the comparability over time (within each country), we have adopted the following procedure. Following a suggestion by Luis Angeles (to whom we are grateful), we formed a series for each country by keeping the observations coming from the same source and survey, which represented the majority of the observations for the country. In this way, we should be confident that Gini coefficients, quintiles and deciles coming from WIID are as comparable as possible – at least along the time evolution, which is crucial in panel models – because known and unknown methodological differences are potentially accounted for. Of course, this

Large and updated land inequality data have remained scarce. Nevertheless, Easterly (2007) has recently suggested the use of the *share of agricultural land occupied by family farms* – recorded every ten years from 1858 to 1998 – assembled from many different sources by Vanhanen (2005), which is a proxy of land and asset inequality. In panel regressions, its data points are too few to yield a meaningful sample size. However, we can exploit another proxy for asset inequality. Despite some data quality issues, Castelló and Doménech (2002) constructed measures of human capital inequality for a panel of 108 countries. Taking attainment levels (average schooling years of the population aged 15 years and over) from Barro and Lee (2001), they compute Gini coefficients and the distribution of education by quintiles over five-year intervals from 1960 to 2000.

Our dataset is completed with the secondary enrolment rate by Barro and Lee (2001), and some macroeconomic variables from the World Development Indicators (World Bank, 2007): annual inflation (consumer price index), GDP per capita, and the ratio of a measure of money supply (monetary aggregate M2) on GDP, capturing the level of financial development.

4. Empirical analysis and results

4.1 Cross-section evidence

Figure 1 plots the Gini-WIID average of the available observations from 1991 to 2000 and of the democratisation index averaged over 1960-1990 – where the vertical and horizontal lines are the averages of Gini index (at 45.52) and democratisation (at 5.44). The regression line has a coefficient of 0.017, and a t-ratio = 0.11 (R-squared = 0.0002, 58 countries). The regression line essentially overlaps with the mean. Hence, there seems to be weak correlation

holds if one assumes that there have been no changes in the methodology of the survey used to construct the series for each country – or if they occurred, they had little effect. However, this also means throwing away a great deal of information. For the majority of developing economies, we would end up with few data points. Then, each selected series have been supplemented with observations originated in other surveys (than the one with the majority of observations) only if at least income definition and the income sharing unit are equivalent, as well as the area and population coverage is most extensive. As indicated in the revision notes of the most recent version of the database manual (UNU/WIDER, 2007), for Latin American countries we kept the observations computed by SEDLAC, as they already display a good degree of harmonization. The procedure, as it is, ensures that inequality measures are as comparable as possible within each country, but leaves us with the problem that they are not comparable among different countries. This could result in a substantial error if one wants to compare developing countries among themselves. Hence, the next step is to amend the above series in a way that they become comparable across countries. Following the ‘old fashioned’ approach, major sources of incomparability across countries have been identified by introducing the dummies for gross income and earnings, expenditure and consumption, and person as a reference unit. Regressing the dummies against the observed data produces the correction factors to estimate the normalisation to *Gini coefficient of disposable household income*.

between the development of democratic systems and income inequality.

Figure 1 [about here]

Figure 2 [about here]

How do property rights correlate with income inequality instead? In figure 2, the scatter plot of the Gini index against the property rights index (respective averages are 45.52 and 4.11) – taken as an average of the available observations from the 1980s to 1990 – shows a moderate, positive correlation, with an estimated coefficient of 1.621, t-ratio=2.02 ($R^2=0.061$, 47 countries). However, when splitting the sample according to the mean (5.44) of the 1960-1990 average of Vanhanen's democracy index, we find that the slope can be quite pronounced in countries below democracy average (dots), while in countries scores above such value (squares), the slope of the regression line switches to negative. Figure 3 suggests that the relationship between income inequality and protection of private property in developing economies could be a nonlinear one. Cross-section results will document if this is the case.

Figure 3 [about here]

Table 1 reports the regression results. The dependent variable is income inequality measured as the average of the available observations over 1991-2000. We first run an OLS regression where the 1980-90 average of property rights and the 1960-90 average democracy enter in linear form, together with the initial values of other determinants of income inequality (taken in years available for most developing economies): land inequality, level of education, financial development and GDP per capita (in log form). The property rights coefficient is insignificant at the conventional levels. But the effect of political and economic institutions on inequality could be more nuanced. When adding the Political rights-Property rights interaction term, the result changes. Both the property rights coefficient, β_2 , and the interaction term coefficient, β_3 , are highly significant. The goodness of fit improves. A linear restrictions test of the joint significance of β_2 and β_3 rejects the null of both being zero at 1% confidence level (also in all the remaining regressions). The third and fourth columns verify that this is not the result of omitted variables, where the coefficients of interest are picking the effect of historical or region-specific factors. Introducing regional dummies and the (natural log of) wheat/sugar ratio, as proposed by Easterly (2007), to capture the historical conditions for inequality as the suitability of land to sugar versus wheat cultivation, does not alter the results.¹³ The fifth column re-estimates the model using robust regression methods, confirming that outliers are not actually driving the key results, while the last two regressions

¹³ Based on FAO data, it is defined as $\log(\text{wheat/sugar})=\log[(1+\text{share of arable land suitable for wheat})/(1+\text{share$

introduce alternative democracy and property rights measures and re-estimate the model using OLS and robust regression.¹⁴ Utilising the *Political Rights* index by Freedom House and the property rights index based on data from the International Country Risk Guide (produced by Political Risk Services and available only from 1984 to 1997) does not affect our key results (magnitudes are different due to different scales).

Table 1 [about here]

Perhaps the most interesting implications arise from the joint interpretation of magnitude and sign of β_2 and β_3 . Following the fourth model, β_2 shows that a one point increase in the property rights score triggers an increase income inequality Gini index of 2.166 points, when democracy scores zero. The ongoing system of property rights will increase inequality, in autocratic regimes. Although empirically relevant (as six countries score zero democratisation), this must be supplemented with an assessment when democracy takes values greater than zero. In figure 4, we report the partial effects at the observed values of the 1960-1990 democratisation index in the sample (continuous line, where each dot is the country's partial effect) and their statistical significance (95% confidence intervals, with a dashed line). For the majority of the countries there is a positive and significant effect of property rights of inequality (significant at least at 5% confidence level) and its value ranges, approximately, from 1.2 to 2.2 Gini points for a one-unit increase in property rights, which seems sizable (the Fraser property rights index has a standard deviation of 1.26).¹⁵ Figure 4 also shows that countries with more democratic political institutions are able to mitigate first, and then to reverse the sign of the marginal effect from positive to negative, so reducing inequality. A second group of countries falls in the region bounded between the two 5% confidence lines of the graph, where the calculated marginal effect is statistically not different from zero.¹⁶ Finally, only a handful countries seem to have created political systems such that the partial effect of economic institutions is reversed and shows a negative sign. In this small group of countries we find India, which is an established democracy. Uruguay, Venezuela and

of arable land suitable for sugarcane)].

¹⁴ We perform Iteratively Reweighted Least Squares (IRLS), which works iteratively by first calculating a measure of influential observations (Cook's distance) and excluding any observation for which such measure is greater than 1. Then it performs a regression, calculates case weights based on absolute residuals, and regresses again using those weights. Iteration stops when the maximum change in weights drops below a given tolerance level. We use the default 0.001.

¹⁵ Many countries falling in this group are Sub-Saharan African economies – e.g. Zimbabwe, Congo (Rep.), Tanzania, South Africa, Kenya, Zambia – also a few are Latin American countries belong to this group, e.g. Haiti, Panama, Chile, Paraguay and Nicaragua. Asian countries in this group are Indonesia, Pakistan and Bangladesh.

¹⁶ In particular, countries scoring a democracy level approximately equal to 4 (out of 21.82, the maximum) are sufficiently democratic to neutralise the inequality-worsening effect of property rights.

Costa Rica also lie in this area. However, the significance of the partial effects for such economies (with more consolidated democracy) is marginal (10% level), at best.

Figure 4 [about here]

4.1.1 Robustness checks

We have experimented with a number of other controls: the square of per capita GDP (to capture the likely existence of a Kuznets curve), inflation, and share of major religions. We have also checked robustness to an alternative democratisation index, using *Polity2index* (from Polity IV project). Sign and significance of the coefficients of interest do not change.

It is also important to investigate if our inference about the population of developing countries might be affected by outlying observations or a few leverage data points so casting doubt on the generality of the results. Therefore, we performed formal checks for influential observations based on popular techniques that can identify countries with either a high leverage or large residuals. We have calculated leverage measures based on hat values, Cook's Distance – considering points with high influence the ones higher than $F_{0.5; k, (n-k)}$ – and the DFITS statistic, taking as a threshold $|DFITS_j| > 2\sqrt{k/N}$. We used them jointly to detect countries that result as influential in more than one measure. Regressions excluding up to five countries with highest values in leverage measures do not significantly change our results.

Next, we have checked to what extent influential observations affect the magnitude of specific coefficients, property rights and its interaction with democracy, by calculating DFBETA statistic. In this case too, results do not show any sensible change by excluding from the regression the values that are above the cut-off $|DFBETA_j| > 2\sqrt{N}$. In particular, countries that seems to be potentially influential are The Philippines, Ghana and Jamaica for the property rights coefficient; and Venezuela for the interaction term coefficient. However, once removed from the regressions, our estimates show little sensitivity.

Table 2 [about here]

Our last robustness test is to exclude each continent from the regression, in turn, to check if any of them drives the results. Table 2 reports the results when using, for example, *Political Rights* and ICRG property rights scores. The signs of the coefficients of interest do not change, although one could have expected the results to be sensitive o the presence of Latin American economies. Magnitudes (and significance) are sensitive to including Sub-Saharan Africa in the sample. However, we estimate the same model with much less information of data, which does result in a loss of precision.

4.2 Panel data evidence

Results based on cross-section averages suggest that strengthening property rights increases income inequality, and this is particularly large in low-democracy environments. So they also signal that political democracy could ‘indirectly’ affect the concentration of income in a market economy, by affecting the functioning of the rules that protect and enforce property rights, although only few developing economies have levels of democratisation high enough to counterbalance such effect. The complement to this analysis is to investigate the existence of a relationship between changes in property rights and changes in income inequality, bearing in mind the methodological caveats on the effectiveness of panel data.

The panel has an unbalanced and unequally spaced structure, spanning from 1970 to 2004. We average our series over 5-year periods (1970-1974, 1975-1979 and so on). But property rights scores (by Fraser institute), the proxy for asset (human capital) inequality, and education data are originally recorded at the very beginning of every 5-year episode (1970, 1975 and so on). The descriptive statistics (reported in the appendix) show that the time dimension of the key variables is short (average T is less than 3 for both inequality and property rights). A significant part of the variation in property rights and democracy occurs within countries (they exhibit similar standard deviations across and within countries). Income inequality, instead, exhibits much variation across countries and little over time (in line with previous literature, e.g. Li et al, 1998), meaning that sharp changes are unlikely. It is a persistent phenomenon, which one has to control for.¹⁷ Hence, we recast the cross section model in a dynamic panel context:

$$Ineq_{it} = \beta_0 + \varphi \cdot Ineq_{it-1} + \beta_1 \cdot I_{it} + \beta_2 \cdot Q_{it} + \beta_3 (Q_{it} \cdot I_{it}) + \sum_{n=1}^k \phi_n \cdot X_{it,n} + \mu_i + \lambda_t + \omega_{it} \quad (3)$$

Equation (3), again, suggests that the effect of protecting private property is conditional on democracy, and incorporates country fixed effects, μ_i , time-specific effects, λ_t (capturing common shocks), and an error term ω_{it} . But it also introduces a lag of the dependent variable. Therefore, a panel data approach requires a further refinement. The resulting Fixed Effects (FE) estimates of φ would be, by construction, correlated with the error term, and are downward biased. This bias would be transmitted to the remaining variables – to the extent that they are correlated to it, thus inducing distortion in the other coefficients, including (overestimation or underestimation of) the impact of institutions (depending on the direction of correlation).

¹⁷ The idea of persistent inequality across generations has a long history. Piketty (2000) reviews the main mechanisms of intergenerational mobility (e.g. transmission of wealth, ability, imperfect capital markets).

Since we are handling a small-T-large-N panel, the size of this bias will not be negligible (as T increases, FE estimator is consistent). This problem can just as well be handled using Generalised Method of Moments (GMM) estimation. In a panel context, lagged values of the endogenous variables are valid instruments, as long as there is no (2nd order) serial correlation in the disturbances. However, such procedures are data intensive and require a fairly large number of consecutive observations: a standard that inequality, and property rights, data does not accommodate. Assuming that the instruments are relevant and valid, the resulting loss of degrees of freedom would be large when exploiting lags to use the available moment conditions. We are constrained by the sample size instead. And only few countries have as many as three adjacent observations for inequality.¹⁸

Notwithstanding, a dynamic approach is still feasible in this context. Several suggestions have been proposed to correct for the bias of the FE estimator (see Baltagi, 2008, pp.147-148). In particular, Bruno (2005) extends previous results on bias approximation for finite samples by Bun and Kiviet (2003) to unbalanced panels. In its essence, this approach first suggests an expression to measure the FE bias and, using Monte Carlo Simulations, considers three possible nested approximations of the bias.¹⁹ We correct for the most comprehensive one, B₃ (in the original notation). This results in a Least Squares Dummy Variable Corrected estimates (LSDVC), initialised by consistent estimates for dynamic models, Anderson and Hsiao (1982) estimator (with instrument in levels), which subtract the bias adjustments for each coefficient from FE estimates and apply bootstrapping to calculate the standard errors of the adjusted coefficients.

¹⁸ Suppose, for example, we use the methodology proposed by Anderson and Hsiao (1982), i.e. to time difference (a simplified version of) equation (3) to remove country fixed effects:

$$\Delta Ineq_{it} = \Delta Ineq_{it-1} + \Delta y_{it-1}\phi + \Delta \lambda_i + \Delta \omega_{it} \quad (4)$$

Such transformation consumes the first observation in each wave. Then equation (4) cannot be estimated consistently by OLS. But, in the absence of serial correlation in the original residual, ω_{it} (i.e., no second order serial correlation in $\Delta\omega_{it}$), $Ineq_{it-2}$ is uncorrelated with $\Delta\omega_{it}$, so can be used as instrument for $\Delta Ineq_{it-1}$ to obtain consistent estimates. Similarly, y_{it-2} is used as an instrument for Δy_{it-1} . It is easy to verify that such procedure rapidly leads our sample size to less than eighty observations when instrumenting $\Delta Ineq_{it-1}$ with two lags (in levels). In addition, we find that the instruments do not always show satisfactory relevance. This is actually a well-known problem daunting the practice of dynamic panels. Estimators relying on first-differencing to eliminate unobserved individual-specific effects will generate, with persistent series (close enough to random walks), first-differences close to innovations, and it will be unlikely that available lags identify the parameters of interest. Intuitively, they tend to be correlated very little with first-differences. Econometric theory has rapidly developed estimators that exploit additional moment conditions (see Baltagi, 2008, 149-163). Although Anderson-Hsiao estimator leads to consistent estimates, it is not efficient, since, under the assumption of no further serial correlation in ω_{it} , not only $Ineq_{it-2}$, but all further lags of $Ineq_{it}$ are uncorrelated with $\Delta\omega_{it}$, and can also be used as additional instruments. For example, Arellano and Bond (1991) develop a GMM estimator using all of these moment conditions. When they are all valid, this GMM estimator is more efficient than Anderson-Hsiao estimators. These and other estimators, that improved on them in recent years, are all the more infeasible. The literature is debating under what conditions one can add additional instruments, trading the loss of degrees of freedom with a potential increase in GMM efficiency (see Baltagi, 2008, pp.164-169).

4.2.1 Results

Table 3 estimates (3) by OLS, *Within* FE and, in the last column, by LSDVC. In dynamic panel data models, OLS and FE are the ‘upper’ and ‘lower bound’ estimates of φ , respectively. They serve the purpose of assessing the bias (in φ as well as β_2 and β_3) and allow comparisons with the adjusted estimates. In our case, β_2 and β_3 are underestimated by OLS, where lagged Gini is overestimated. The opposite holds for unadjusted FE estimates. LSDVC estimates fall in between, as expected. The effects of property rights and democracy on inequality are as expected, not just in the long run (as found in the cross-section estimates) but also when looking at their changes, as captured by FE estimator.

Table 3 [about here]

In a dynamic context, the ‘short run’ (5-year) impact of property rights on inequality is our usual partial effect as expressed by β_2 and β_3 . This can now be distinguished from the long run multiplier. If causal, this estimate would imply that a one-unit strengthening of private property protection increases the ‘steady-state’ value of inequality by a cumulative, long run effect of $(\beta_2 + \beta_3 / \varphi) / (1 - \varphi)$. The bias-adjusted FE model suggests it is: $(1.34 - 0.081 * I) / (1 - 0.449)$, which is equal to 2.431, when evaluated at democracy first decile (which is zero). The corresponding effect for one standard deviation of property rights, instead, would be 3.35 Gini points. This effect is relatively large, bearing in mind that the mean of inequality in developing countries is 49.76.²⁰

Note also that, since Vanhanen’s democratisation minimum score is zero in a nontrivial number of cases (31.24% cases), β_2 (and its corresponding long-run effect) can have an interpretation that is theoretically – as well as empirically – relevant for the ‘short run’ impact of property rights on inequality. However, a full assessment of the partial effects shall also look at when the moderating effect of β_3 is taken into account, i.e., when democratisation takes values greater than zero. Based on the estimates of the LSDVC regression, in table 4, we have calculated significance and magnitude of the effects of property rights evaluated at different points of the democracy distribution for the whole sample of developing economies. We have substituted to β_3 the median score of democratisation, its 1st and 4th quartile, as well as its 1st and top decile scores.

Table 4 [about here]

There is a positive effect when the partial effect of property rights is evaluated at the

¹⁹ In particular, with an increasing level of accuracy: $B^1 = c_1(T^1)$; $B_2 = B_1 + c_2(N^1 T^1)$; $B_3 = B_2 + c_3(N^1 T^2)$.

²⁰ Incidentally, the lagged inequality coefficient implies that, in a five-year period, developing economies close 55.51% of the gap between the ‘equilibrium’ value of inequality and its current value.

first decile and quartile of democracy (which is the same, as they are both zero) of 1.34 inequality points, for a one-unit increase in property rights. The effect of a one-standard deviation change in property rights (1.583 points) could trigger an increase of 2.12 Gini points in a five-year timeframe. The partial effect is still positive and marginally significant when democracy is at its median. For a relevant number of countries in the sample, there is an increase in inequality associated when property rights protection is greater. The partial effect is still positive when democracy is measured at its 3rd quartile, but is insignificant. Finally, when democracy at its top decile is plugged in, the partial effect changes its sign into a negative one, but it is not statistically significant. This is interesting though. For it shows that only when countries achieve a high level of democracy they have sufficiently representative systems to reverse the inequality-worsening effect of property rights regimes, or at least neutralise it. To put it another way, few countries seem to have equitable political institutions such that the partial effect of economic institutions may be reversed and show a negative sign.

4.2.2 Further results on the role of democratisation

The type of political environment could also affect the access to production factors: physical and financial capital, land, human capital. Developing democratic attributes – franchise extension, freedom of association, government accountability – could influence the functioning of the education system, the land and credit markets. Governments can be forced by the electoral process to design land reforms and to regulate the credit market that would thus become less concentrated. Human capital can become affordable to the have-nots, in democracies, by promoting the acquisition of skills among different sectors of the population, improving the quality of education systems and public health care (e.g. Robinson, 2001; Lake and Baum, 2001; Baum and Lake, 2003). Therefore, in democracies, the extent of education, land inequality and financial development can have a different impact than in nondemocracies, improving the access to the factors of production for the poor.

Table 5 [about here]

To test if property rights actually picking the effect such mechanisms, we have interacted democracy with our proxy for asset inequality, financial development and education. We expect that the effect of education and financial development reduce income inequality, such effects are stronger in more democratic systems; the effect of asset inequality increases income inequality, but this effect is weaker in democracies. Results are reported table 5, where we repeat the same exercise as in table 3, when including all the hypothesised interaction terms of democracy. We would expect that the effect of education and of financial

development reduces income inequality, and such effects should be stronger in democracies. But there is no evidence that democracy has an effect through the functioning of education, financial development, and the distribution of assets. The only channel is by influencing the functioning of property rights rules as the only significant interaction term of democracy is the one with property rights.

We have experimented with other democracy data – e.g. Polity IV, using the Polity2 variable – obtaining similar results. As a robustness check, tables 3 and 5 regressions have also been estimated when excluding, in turn, the continents from the regression. Signs stay as expected in all cases. However, when excluding Latin American and Asian countries, our coefficients of interest lose significance at the conventional levels. However, it must also be said that the sample size drops (sharply) to 64 and 86 observations respectively. Hence, it is difficult to tell if Latin America or Asia are crucial for the results because of their relevance to the hypotheses under investigation or simply because we have a loss of degrees of freedom.²¹

4.2.3 A closer look at the distribution of income

The results from a dynamic specification can also be analysed for different segments of the distribution of income (table 6): the share of income accruing to the bottom and the top quintiles and deciles as well as the share of income accruing to the three middle quintiles. We find that, in the absence of democracy, property rights institutions increase the share of income of the upper classes, and decrease the share of the middle class (the sum of the three middle quintiles). This effect should be eroded when democracy increases. Finally, there is no evidence of property regimes depressing the share of income accruing to the bottom quintile and deciles, which is interesting because it is suggestive of the effects of institutions on poverty. The message is that, in the absence of political equality, economic institutions make the upper classes richer while leaving the lower classes trailing behind.

Table 6 [about here]

We have also extended the results of table 5 to the case of multiple interactions of democracy, to check if they might be affecting specific classes. The same observations of the foregoing discussion remain valid.

²¹ Two further remarks are in order. Measurement error, as the discrepancy between our institutional indicators and the ‘true’ concept of institutions we would like to capture, could affect both property rights and democracy. If the noise can be approximated by classic errors in variables assumption (measurement error is uncorrelated with the true variable we would like to observe), this is a source of attenuation bias. Therefore, it stacks the odds against our results, implying that estimates of the partial effect of property rights are conservative. Secondly, a brief remark on endogeneity is due. Income inequality and property rights simultaneously affects each or they could be linked over time by a feedback process. Perhaps it could not be a concern as we find no evidence of 2nd-order serial correlation in the residuals, suggesting there may be no feedback from inequality to institutions.

4.3 Discussion of results

Fixed Effects evidence confirms our previous cross-section results and shows that positive changes in property rights protection are associated with a change in the same sign of income inequality. Moving towards a more democratic political system can counteract this effect. Hence, strengthening property rights regimes can increase the concentration of income in the hands of the few, especially in countries with poor levels of political equality. A closer look at distribution of income reveals that property rights increase the income of top quintile and decile, and decrease the middle class share. An increase in democratisation would counterbalance this, while we have weak evidence that property rights affect the share of bottom quintile and decile. The role of democracy seems to be an ‘indirect’ one, working only through the property system. In fact, we find no evidence that democracy affects inequality by moderating the effect of financial development, education or forms of asset inequality.

Taken together, cross-section and panel data results show an interesting empirical regularity, which is robust to the extent that the effect of property rights does not result from the omission of any regional fixed effect, historical or country-specific factor (as well as common shocks). We find that economic institutions have a distributional impact in developing economies. But such impact is conditional on the level of democratisation. However, one should not be tempted to make stronger claims. Since cross-section regressions do not control for country and time effects, FE estimator is, in principle, an effective complement to cross section evidence, but it also removes all the important variation in income inequality. In addition, the limited sample size does not allow to assess issues of robustness and, more importantly, to address endogeneity as one should want to.

5. Summary and conclusions

This paper has tried to bring together two hypotheses. First, economic institutions can have a direct impact on income distribution. Second, the extent to which political power is shared among citizens matters for the functioning economic institutions, thus making their impact different at different stages of democratisation. Taken together, the two hypotheses are complements and express the idea that both political and economic rules are important for income inequality.

We test both hypotheses by estimating the effect of property rights regimes and political democracy on income inequality on a sample of developing countries. Using cross-section and panel data techniques, we estimate a model that embodies the possibility of

interaction between political democracy and property rights measures. We find that property rights significantly increase the level of income inequality in the vast majority of developing countries, especially in low-democracy political environments. Suggesting that institutions in these economies tend to serve the interests of a minority. The inequality-increasing effect may be counterbalanced only in systems which are able to develop sufficiently inclusive political institutions. As the democratisation process unfolds, this effect should be reduced, albeit to a limited extent, implying that more political equality modifies the functioning of institutions so to ease economic inequality. The role of democracy seems to be an 'indirect' one and is channelled only through the property rights system. In fact, we find no evidence that democracy affects inequality by moderating the effect of financial development, education and asset inequality.

Our results seem to support the view that, in the last decades, institutional arrangements in most developing countries have worked according to the interests of dominant groups, thereby not granting opportunities to lower classes. A limitation of our analysis is that it is not able to assess the specific channels through which property rights affect inequality. This remains at speculative level – e.g. oligarchies' rent-seeking behaviour and control of key markets – and perhaps deserves further investigation.

The effect of inequality on development has attracted a lot of attention again since the 1990s. Recently, a *World Development Report* (World Bank, 2005) has argued that inequality hinders development as it prevents the poor from being part of the economically active population and restricts the equality of opportunities for some members of the society so diverting resources from investment. The relationships we have identified are relevant in the analysis of the inequality-development relationship. They flag the importance of institutional issues and might lead to some interesting policy indications. Even when stimulating investment, property rights systems could also harm economic activity in the long-run, if inequality reaches socially unsustainable levels. When designing reforms aimed at strengthening investment incentives, the distributional consequences of institutional change cannot ignore issues of political equality either (and its consolidation within the political system). The likely outcome could be attractive: getting economic institutions right – property rights, in particular – could deliver both efficiency and equity.

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Appendix

Table A1: List of countries

	Asia (9)	JAM	Jamaica	ETH	Ethiopia
BGD	Bangladesh	MEX	Mexico	GAB	Gabon
IND	India	NIC	Nicaragua	GMB	Gambia, The
IDN	Indonesia	PAN	Panama	GHA	Ghana
MYS	Malaysia	PRY	Paraguay	GIN	Guinea
PAK	Pakistan	PER	Peru	GNB	Guinea-Bissau
PNG	Papua New Guinea	TTO	Trinidad & Tobago	KEN	Kenya
PHL	Philippines	URY	Uruguay	MLI	Mali
LKA	Sri Lanka	VEN	Venezuela, RB	MWI	Malawi
THA	Thailand	North Africa & Mid. East (7)		MRT	Mauritania
Latin America & Carib. (21)		DZA	Algeria	MOZ	Mozambique
ARG	Argentina	EGY	Egypt, Arab Rep.	NER	Niger
BOL	Bolivia	IRN	Iran, Islamic Rep.	NGA	Nigeria
BRA	Brazil	JOR	Jordan	RWA	Rwanda
CHL	Chile	MAR	Morocco	SEN	Senegal
COL	Colombia	TUN	Tunisia	SLE	Sierra Leone
CRI	Costa Rica	TUR	Turkey	ZAF	South Africa
DOM	Dominican Rep.	Sub-Saharan Africa (25)		UGA	Uganda
ECU	Ecuador	BWA	Botswana	TZA	Tanzania
SLV	El Salvador	BFA	Burkina Faso	ZMB	Zambia
GTM	Guatemala	CIV	Cote d'Ivoire	ZWE	Zimbabwe
GUY	Guyana	CAF	Central African Rep.		
HND	Honduras				

Table A2: Descriptive statistics, cross-section sample

Variable	Obs	Mean	Std. Dev.	Min	Max
Family farms land (%) 1988	58	43.431	16.907	8	73
Gini coeff. 1991-2005 (WIID)	58	45.510	8.428	28.9	63.18
ln(GDP) 1980	58	7.402	0.792	5.73	9.327
Prop. rights 1980-1990 (Fraser)	47	4.106	1.256	2.071	6.475
Prop. rights 1980-1990 (ICRG)	55	22.707	6.264	10.851	37.014
M2/GDP 1986-1990	58	46.057	103.164	0.868	798.42
Political rights 1972-1990	58	2.466	1.586	0.055	6
Democratisation 1960-1990	58	5.437	5.952	0	21.817
Education (sec. enrolment rate) 1965	57	16.298	13.468	1	53
ln(wheat/sugar)	53	-0.019	0.149	-0.392	0.577

Table A3: Descriptive statistics, panel data sample

Variable		Mean	Std. Dev.	Min	Max	Observations
Gini coeff.	overall	49.764	10.118	29.897	77.169	N = 120
	between		10.536	31.304	77.169	n = 42
	within		2.358	42.408	57.906	T-bar = 2.857
Bottom quintile share	overall	3.742	1.321	1.300	7.93	N = 72
	between		1.377	1.300	7.78	n = 30
	within		0.366	2.130	5.075	T-bar = 2.4
Top quintile share	overall	56.201	6.197	42.165	77.355	N = 72
	between		6.710	42.782	77.355	n = 30
	within		1.672	49.807	63.101	T-bar = 2.4
Bottom decile share	overall	1.297	0.585	0.257	3.43	N = 72
	between		0.603	0.257	3.19	n = 30
	within		0.171	0.608	1.746	T-bar = 2.4
Top decile share	overall	40.171	6.589	26.7	67.439	N = 72
	between		7.551	27.697	67.439	n = 30
	within		1.615	34.071	46.371	T-bar = 2.4
Middle class share	overall	39.943	5.125	21.066	51.2	N = 70
	between		5.656	21.066	49.922	n = 29
	within		1.367	34.632	45.281	T-bar = 2.413
Prop. rights (Fraser)	overall	4.716	1.300	1.583	7.407	N = 120
	between		1.113	2.439	6.556	n = 42
	within		0.821	2.090	6.539	T-bar = 2.857
Democratisation (Vanhanen)	overall	13.187	9.166	0	40.76	N = 120
	between		7.842	0	31.3872	n = 42
	within		5.113	-10.779	22.72976	T-bar = 2.857
Education (years of schooling)	overall	1.157	0.599	0.122	2.796	N = 120
	between		0.588	0.122	2.15	n = 42
	within		0.254	0.364	2.577	T-bar = 2.857
Inflation (CPI)	overall	55.180	42.015	1.16e-09	150.148	N = 120
	between		34.017	0.300	138.127	n = 42
	within		30.292	-3.652	163.541	T-bar = 2.857
ln(GDP)	overall	7.327	1.085	4.940	8.955	N = 120
	between		1.093	4.983	8.847	n = 42
	within		0.168	6.565	7.882	T-bar = 2.857
M2/GDP	overall	38.109	22.445	8.186	119.625	N = 120
	between		20.139	8.186	107.288	n = 42
	within		9.667	-7.358	72.385	T-bar = 2.857
Asset inequality	overall	44.701	17.775	20	90.7	N = 120
	between		19.012	21.571	90.7	n = 42
	within		3.818	32.001	56.0016	T-bar = 2.857

Figure 1: Inequality and Democracy

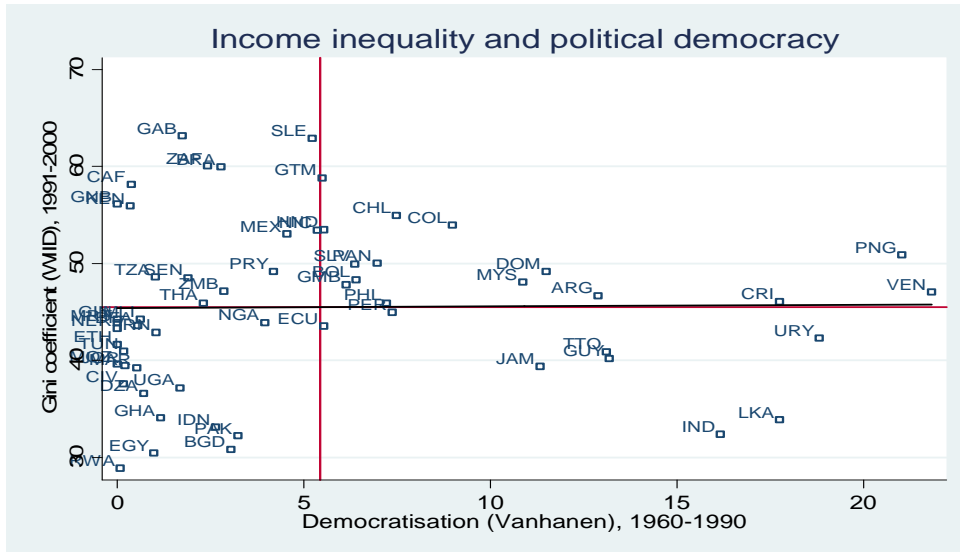


Figure 2: Inequality and Property rights

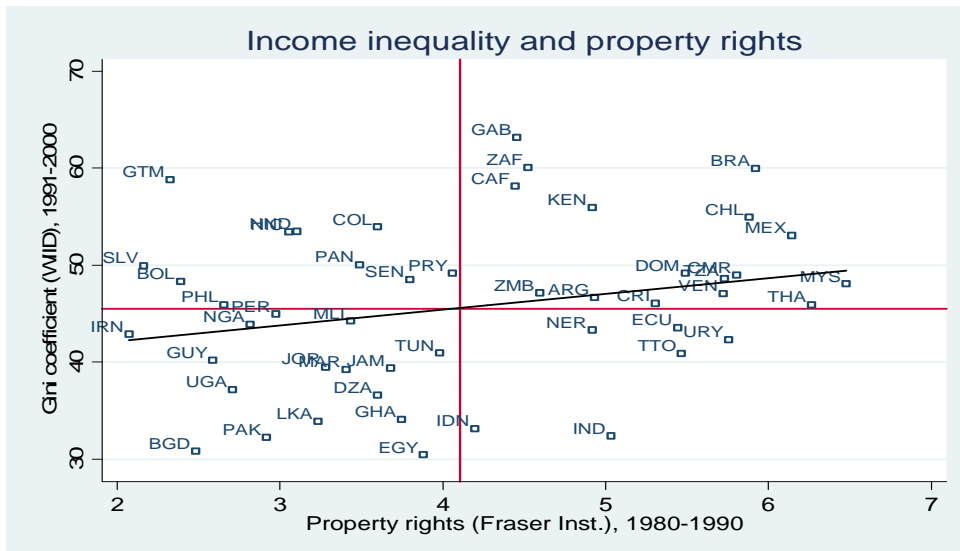


Figure 3: Inequality and Prop. rights at advanced and early stages of democratisation

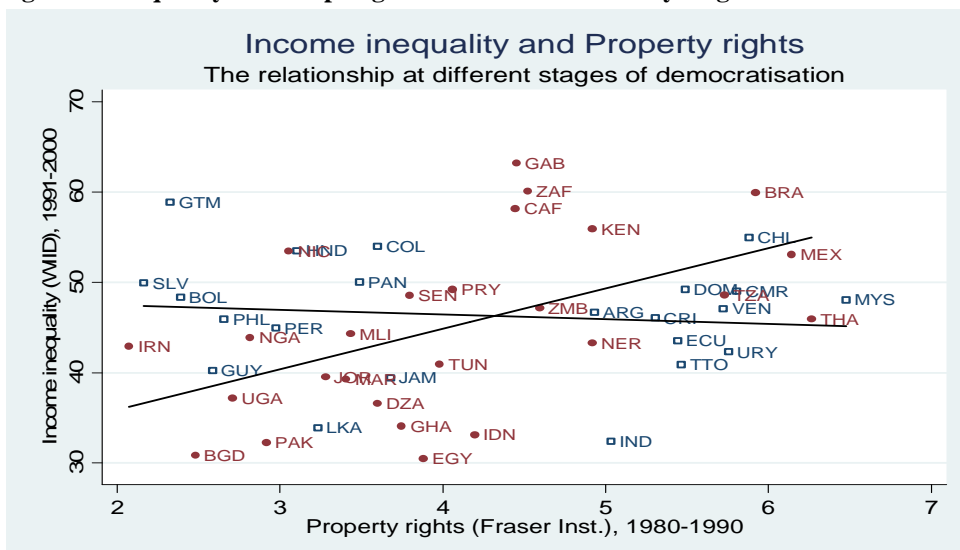


Table 1 - Income inequality, property rights and democracy

Dependent variable: Gini coefficient, 1991-2000 (WIID)	ols1	ols2	ols3	ols4	IRLS	ols8	IRLS
Education 1965	-0.130 (0.130)	-0.218 (0.144)	-0.229 (0.154)	-0.257 (0.170)	-0.448*** (0.120)	-0.275** (0.117)	-0.386*** (0.090)
M2/GDP 1986-1990	-0.087 (0.054)	-0.061 (0.056)	0.036 (0.068)	0.058 (0.070)	0.145** (0.054)	0.068 (0.060)	0.130** (0.049)
Family farms land (%) 1988	-0.192*** (0.059)	-0.173*** (0.060)	-0.088 (0.074)	-0.044 (0.066)	-0.008 (0.077)	-0.036 (0.088)	0.026 (0.086)
ln(GDP) 1980	3.202 (2.026)	4.249* (2.131)	6.476*** (2.004)	7.695*** (1.379)	7.971*** (1.905)	6.812*** (1.419)	5.818*** (2.015)
Democ. 1960-1990	-0.348* (0.206)	1.198* (0.680)	1.011 (0.608)	1.042 (0.695)	1.523* (0.825)		
Political rights 1972-1990						6.436*** (1.929)	5.891* (3.195)
Prop.Rights 1980-90 (Fraser)	1.335 (0.831)	3.045*** (0.954)	1.830* (0.973)	2.166** (0.938)	2.571** (1.174)		
Prop.Rights 1980-90 (ICRG)						1.630*** (0.378)	1.641** (0.652)
Prop.rights * Democratis.		-0.312** (0.121)	-0.276** (0.109)	-0.281** (0.120)	-0.361** (0.156)	-0.476*** (0.120)	-0.442** (0.201)
MENA			-5.307 (3.670)	-8.459** (3.110)	-8.159** (3.985)	-8.872** (3.629)	-8.189** (3.828)
Sub-Saharan Africa			9.444*** (3.366)	9.985*** (3.305)	12.163*** (2.993)	7.393** (3.419)	9.852*** (2.968)
Latin America			5.653 (4.288)	6.541 (4.570)	11.985*** (3.637)	6.306 (5.159)	12.137*** (3.897)
ln(wheat/sugar)				-4.115 (5.641)	1.543 (5.826)	-10.766** (5.094)	-7.407 (5.360)
Constant	31.502** (14.791)	15.464 (17.420)	-7.532 (17.341)	-20.471 (12.348)	-29.471* (15.851)	-28.002** (10.649)	-26.661 (16.703)
F-stat	9.416***	7.519***	9.456***	14.466***	9.515***	18.521***	9.109***
Adj. R-Sq.	0.338	0.373	0.520	0.601	0.685	0.617	0.690
Obs.	47	47	47	44	44	41	41
RMSE	6.791	6.608	5.782	5.391	5.319	5.144	4.978
Estimator	OLS	OLS	OLS	OLS	IRLS	OLS	IRLS

Note: *, ** and *** stand for significant at 10, 5 and 1% respectively, two-tailed test - Heteroskedasticity-Robust Standard errors in parenthesis. OLS specifications pass Normality test of residuals (Jarque-Bera test) and Ramsey RESET test (with square and cubic y-hat).

Figure 4: Partial effect of property rights at different stages of democratisation

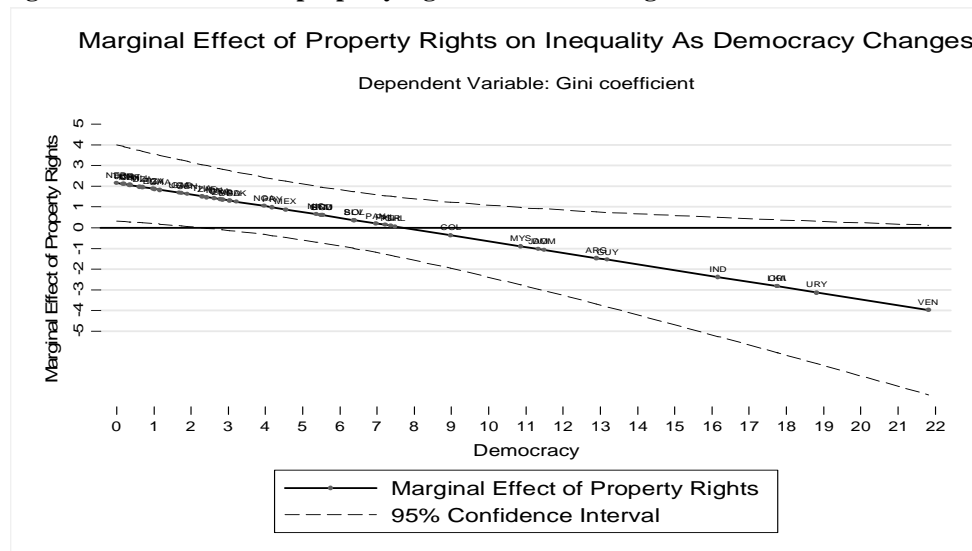


Table 2 - Income inequality, property rights and democracy - OLS estimates				
Dependent variable: Gini coefficient, 1991-2000 (WIID)				
Excluded continent:	Latin America	Asia	MENA	SS Africa
Education 1965	-0.188 (0.202)	-0.196 (0.139)	-0.316*** (0.082)	-0.114 (0.110)
M2/GDP 1986-1990	-0.012 (0.116)	-0.085 (0.087)	0.030 (0.032)	-0.043 (0.055)
Family farms land (%) 1988	-0.140 (0.214)	-0.134 (0.084)	-0.109* (0.056)	-0.127* (0.066)
log(GDP) 1980	1.600 (3.339)	4.338* (2.378)	6.987*** (1.275)	7.629** (2.760)
Political rights 1972-1990	12.471** (4.756)	6.681*** (2.370)	7.738*** (1.953)	5.505 (4.591)
Prop. rights 1980-1990 (ICRG)	3.442** (1.307)	1.563*** (0.549)	1.946*** (0.480)	1.429* (0.727)
Prop. rights * Pol. rights	-0.875* (0.403)	-0.479*** (0.154)	-0.578*** (0.123)	-0.397 (0.272)
log(wheat/sugar)	-29.862* (13.908)	-7.562 (5.562)	-11.631** (5.462)	-15.669** (6.296)
Constant	-7.793 (22.690)	3.625 (20.102)	-23.218* (11.507)	-25.355 (27.551)
F-stat	6.080***	3.217***	17.495***	8.409***
Adj. R-Sq.	0.232	0.373	0.529	0.490
Obs.	21	33	38	32
RMSE	7.770	5.949	5.549	5.879

Note: *, ** and *** stand for significant at 10, 5, and 1% respectively, two-tailed test - Heteroskedasticity-Robust Standard errors in parenthesis. OLS specifications pass Normality test of residuals (Jarque-Bera test) and Ramsey RESET test (with square and cubic y-hat).

Table 3 - Income inequality: Dynamic model			
Dependent variable: Gini coefficient (WIID)			
Estimation method:	OLS	Within FE	LSDVC
Gini _{t-1}	0.947*** (0.043)	0.282** (0.137)	0.449*** (0.127)
Education	-1.076 (0.870)	0.455 (1.732)	0.257 (1.851)
M2/GDP	-0.010 (0.015)	0.004 (0.052)	-0.003 (0.039)
Asset inequality	-0.029 (0.039)	0.230** (0.095)	0.197** (0.092)
Property rights	0.318 (0.697)	1.409** (0.659)	1.340** (0.668)
Democratisation	0.080 (0.177)	0.380** (0.144)	0.371* (0.204)
Prop.Rights * Democratisation	-0.030 (0.035)	-0.084*** (0.030)	-0.081** (0.038)
lnGDP	-14.301** (6.536)	-3.385 (13.188)	-7.284 (14.481)
lnGDP ²	0.968** (0.461)	-0.037 (0.988)	0.254 (0.995)
Inflation (CPI)	0.035 (0.023)	0.021 (0.015)	0.020 (0.021)
Constant	54.286** (20.879)	40.219 (45.325)	
Time effects	Yes	Yes	Yes
F-stat	70.831***	23.298***	
R-Sq.	0.891	0.541	
Obs.	120	120	120
Countries	42	42	42

Note: *, **, *** and **** stand for significant at 10, 5, 1 and 0.1% respectively, two-tailed test - FE and Pooled OLS Standard errors, in parenthesis, are robust for arbitrary heteroskedasticity and clustering at the country level. LSDVC standard errors are calculated by bootstrapping (50 repetitions) - Time dummies are jointly significant.

Table 4 – Partial effect of property rights at different democratisation stages

Democratisation 1 st decile (0)						
Marg. effect on Inequality	Coef.	Std. Err.	z	P-value	95% Conf.Interval	
	1.340	0.668	2.01	0.045	0.031	2.649
Democratisation 1 st quartile (0)						
Marg. effect on Inequality	Coef.	Std. Err.	z	P-value	95% Conf.Interval	
	1.340	0.668	2.01	0.045	0.031	2.649
Democratisation median (3.16)						
Marg. effect on Inequality	Coef.	Std. Err.	z	P-value	95% Conf.Interval	
	1.085	0.579	1.87	0.061	-0.050	2.221
Democratisation 3 rd quartile (12.58)						
Marg. effect on Inequality	Coef.	Std. Err.	z	P-value	95% Conf.Interval	
	0.324	0.418	0.78	0.438	-0.495	1.144
Democratisation 10 th decile (18.52)						
Marg. effect on Inequality	Coef.	Std. Err.	z	P-value	95% Conf.Interval	
	-0.155	0.451	-0.34	0.730	-1.040	0.728

Note: observed quartile and decile values are in parentheses

Table 5 – Income inequality: Dynamic model with democracy interactions

Dependent variable: Gini coefficient (WIID)			
Estimation method:	OLS	FE, within	LSDVC
Gini _{t-1}	0.926**** (0.044)	0.328** (0.138)	0.514**** (0.135)
Education	-3.461* (1.900)	-0.941 (3.680)	-1.423 (3.077)
M2/GDP	-0.003 (0.039)	-0.008 (0.105)	-0.015 (0.081)
Asset inequality	-0.026 (0.055)	0.196*** (0.068)	0.158 (0.104)
Property rights	0.794 (0.643)	1.492** (0.590)	1.422** (0.674)
Democratisation	0.124 (0.242)	-0.067 (0.323)	-0.140 (0.437)
Prop.Rights * Democratisation	-0.073** (0.031)	-0.087*** (0.031)	-0.085** (0.039)
Education * Democratisation	0.155 (0.109)	0.124 (0.184)	0.145 (0.163)
M2/GDP * Democratisation	0.000 (0.002)	0.001 (0.004)	0.001 (0.004)
Asset inequality * Democrat.	-0.070 (0.369)	0.816* (0.443)	0.924 (0.572)
lnGDP	-12.182* (6.294)	-10.637 (11.705)	-16.125 (17.074)
lnGDP ²	0.827* (0.444)	0.471 (0.876)	0.862 (1.186)
Inflation (CPI)	0.031 (0.023)	0.021 (0.015)	0.021 (0.022)
Constant	47.260** (19.151)	65.036 (42.406)	
Time effects	Yes	Yes	Yes
F-stat	51.164****	35.753****	
R-Sq.	0.897	0.566	
Obs.	120	120	120
Countries	42	42	42

Note: *, **, *** and **** stand for significant at 10, 5, 1 and 0.1% respectively, two-tailed test – FE and Pooled OLS standard errors, in parenthesis, are robust for arbitrary heteroskedasticity and clustering at the country level. LSDVC standard errors are calculated by bootstrapping (50 repetitions). Time dummies are jointly significant.

Table 6 - Income inequality: Dynamic model, LSDVC estimates by income shares					
Dependent variable:	1 st quintile	5 th quintile	1 st decile	10 th decile	Middle class share
Inequality _{t-1}	0.015 (0.220)	0.220 (0.177)	0.037 (0.209)	0.256 (0.177)	0.241 (0.195)
Education	-0.561 (0.789)	1.063 (1.613)	-0.256 (4.398)	0.940 (1.560)	-0.603 (1.403)
M2/GDP	0.004 (0.018)	-0.033 (0.034)	0.004 (0.099)	-0.042 (0.033)	0.022 (0.034)
Asset inequality	-7.325 (5.225)	13.469 (9.815)	-3.212 (28.047)	11.116 (9.316)	-9.246 (8.889)
Property rights	-0.155 (0.380)	1.749*** (0.675)	-0.037 (2.212)	1.995*** (0.665)	-1.533** (0.662)
Democratisation	-0.052 (0.119)	0.325 (0.215)	-0.018 (0.670)	0.354* (0.208)	-0.266 (0.174)
Prop.Rights * Democrat.	0.010 (0.022)	-0.065 (0.040)	0.003 (0.124)	-0.067* (0.039)	0.056* (0.034)
ln(gdp)	-5.113 (16.005)	29.064 (31.089)	-4.203 (91.370)	34.568 (30.185)	-18.853 (24.047)
ln(gdp) ²	0.409 (1.040)	-2.143 (2.034)	0.308 (5.982)	-2.408 (1.974)	1.440 (1.533)
Inflation (CPI)	-0.000 (0.009)	0.003 (0.018)	0.000 (0.051)	0.004 (0.017)	-0.001 (0.010)
Time effects	Yes	Yes	Yes	Yes	Yes
Obs.	66	66	66	66	65
Countries	28	28	28	28	27

Note: *, **, *** and **** stand for significant at 10, 5, 1 and 0.1% respectively, two-tailed test. LSDVC standard errors are calculated by bootstrapping (50 repetitions). Time dummies are jointly significant.