



**Inequality *does* Cause  
Underdevelopment:  
New evidence**

By William Easterly

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## Inequality *does* cause underdevelopment:

New evidence from commodity endowments, middle class share, and other determinants of per capita income

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*“We have no middle class; there are the rich, who are very rich, and the poor, who are very poor.” Governor of Chiapas, Mexico, Absalón Castellanos Domínguez, 1982*

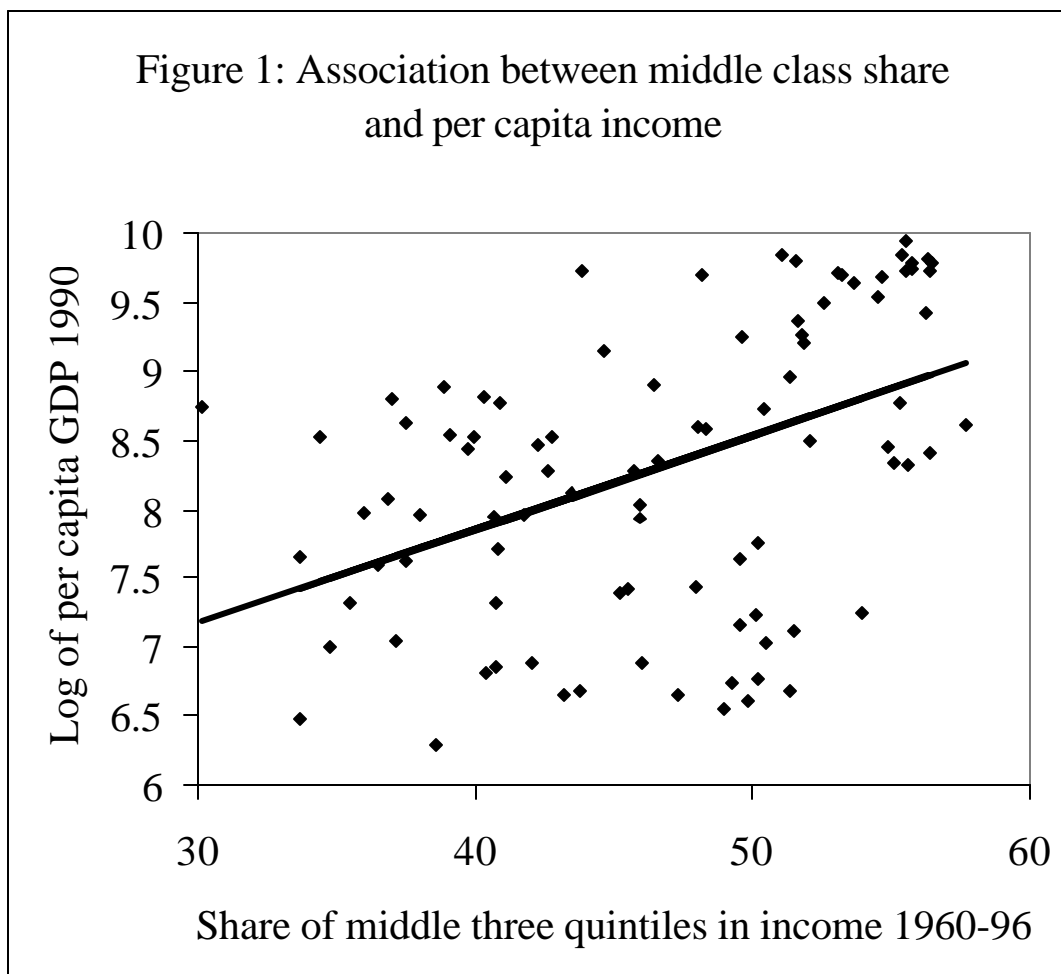
*“No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable.” Adam Smith, *The Wealth of Nations*, p. 79, 1776.*

The effect of inequality on economic growth continues to be hotly debated. A first wave of the development literature argued that high inequality could help growth by directing more income to high-saving capitalists (Lewis 1954, Kaldor 1956, 1961). The new growth literature reversed this prediction with a set of theoretical models and empirical studies arguing that inequality harmed growth through political economy channels (Alesina and Rodrik 1994, Persson and Tabellini 1994). This in turn has brought forth a challenge from Forbes 2000, who claims to empirically confirm the original development notion that inequality has a positive relationship with growth. So which is it?

This paper suggests that one important piece of evidence has largely been overlooked in this debate. There is a strong association between relative equality (measured here by share of income accruing to the middle 3 quintiles) and LEVEL of per capita income (Figure 1). The association is highly significant (t-statistic = 5.6). Only 13 percent of countries that are in the lowest tercile of middle class share are in the upper tercile of income, while 69 percent of countries that are in the upper tercile of middle class share are also in the upper tercile of income. Looking at it the other way around, only 10 percent of the richest third of countries are in the bottom third of middle class share, while 85 percent of the richest third of countries are also in the upper third of middle class share.

If this link is causal from inequality to income, it provides further strong evidence that there is a long-run negative association between growth (of which log income is of course the cumulative sum) and inequality. Inequality is highly persistent over time, so the last 3 decades' average inequality likely reflects cross-sectional differences that have been present for some time.

The causality could be the reverse – maybe rich societies can afford redistribution. This paper suggests an empirical strategy to identify the causal link from inequality to income (as well as to test for reverse causality from income to inequality). It finds a causal link from inequality to underdevelopment and fails to find evidence for the reverse link from income to inequality.



The empirical strategy is inspired by a hypothesis due to economic historians Engerman and Sokoloff (1997) and Sokoloff and Engerman 2000 (henceforth ES). They suggest factor endowments are a central determinant of inequality, and inequality in turn is a determinant of bad institutions, redistributive policies, low human capital investment, and underdevelopment. Hence this paper will use measures of factor endowments as instruments that can be used to assess the causal inequality and development relationship. ES argues that the land endowments of Latin

America lent themselves to commodities featuring economies of scale and the use of slave labor (sugar cane, silver) and thus were historically associated with high inequality. In contrast, the endowments of North America lent themselves to commodities grown on family farms (wheat, maize) and thus promoted the growth of a large middle class.

ES also point to open European immigration to North America as another factor that facilitated the emergence of a middle class, while restrictions on European immigration to Latin America meant that the original European colonizers held disproportionate wealth in a small number of families (e.g. the famous 14 families of El Salvador). While I don't have a direct empirical measure of restrictions on European immigration, I can borrow the European settler mortality of Acemoglu, Johnson, and Robinson 2001 (hereafter AJR) as another exogenous factor that influenced European immigration. The higher mortality rates in Latin America reinforced the effect of legal restrictions in limiting European immigration compared to North America. The work of ES follows a long history literature that postulates domination by the elite owners of *encomiendas* (land grants from the crown accompanied by feudal rights over the indigenous population) as the "original sin" of Latin American underdevelopment (Chasteen 2000).<sup>2</sup>

In contrast, observers have suggested at least since the 19<sup>th</sup> century that the United States had an unusual level of equality. In the famous opening words of De Toqueville's *Democracy in America*: "amongst the novel objects that attracted my attention during my stay in the United States, nothing struck me more forcibly than the general equality of conditions."<sup>3</sup> Similarly, Landes 1998 cites "the great English middle class" as a reason for England's being first at industrialization (p. 221).

ES suggest that the elite in Latin America opposed democracy and mass investment in human capital because they were afraid of the poor majority gaining power (people with more

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<sup>2</sup> Other economic historians and development economists have previously noted the importance of a large middle class for development. Adelman and Morris 1967 noted that "in the economic development of Western Europe, the middle classes were a driving force". Moreover, they presciently said that "it is clear from many country studies that the growth of a robust middle class remains of crucial importance in contemporary low-income nations"(p. 30, Adelman and Morris 1967).

human capital are more politically active). Bourguignon and Verdier 2000 have a theoretical model with the same prediction. The elite feared in particular that the majority would use power to redistribute income and rents away from the elite towards the majority. ES note that even when Latin American nations were nominal democracies, they imposed literacy or wealth requirements for voting that sharply restricted the franchise well into the 20<sup>th</sup> century. And ES point out that Latin America trailed well behind North America in establishing universal free schooling and raising literacy.

Although these theories predict that elites will dominate the state, the elite regimes were inherently unstable because of divisions among the elite or because renegade elites occasionally co-opted the masses with populist or socialist revolutions. Regardless of which class was in power, rent-seeking was preferred to future income creation under circumstances of high inequality. In contrast, a consensus for democracy, mass schooling, and future income creation emerged in middle class North America (with the antebellum South a sort of middle case between Latin and North America). Hence, the mechanisms by which inequality affected development in the ES hypothesis are clearly specified: high inequality is associated with poor institutions (less democracy and more instability), rent-seeking policies, and low human capital creation.

The ES hypothesis (and the Bourguignon and Verdier 2000 theory) implies that the rich have privileged access to political power and can use the coercive power of the state to extract commodity rents. Hence, even commodities that do not have economies of scale can lend themselves to the extraction of rents by the rich, either through the use of slaves to produce the commodity in historical times or simply through taxation (explicit or implicit) by the state in modern times. Commodities may differ in their ease of expropriation by the political and economic elite. The diversion of particular commodity rents to the rich would further enhance pre-existing inequality, giving us another reason to expect inequality to be associated with commodity endowments.

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<sup>3</sup> De Toqueville obviously had a blind spot regarding African-American slaves and Native Americans.

Hall and Jones 1999 suggest that there are two equilibria – predatory and productive -- for institutions and rent-seeking. In the predatory equilibrium, resources are diverted towards seeking to seize others' assets or protecting one's own assets against predators. In the productive equilibrium, no resources are spent on predation or protection against predation and instead resources are spent on asset creation. There are multiple equilibria because if everyone else is being a predator, you have to devote your own resources to protection and to be yourself a predator. In contrast, if everyone else is being a producer, you can also redirect resources away from protection and predation towards production. Many authors have pointed out that a higher gap between rich and poor would tend to raise the returns to predation relative to production.

ES are not alone in pointing to commodity endowments as affecting inequality. A long literature describes how many natural resources lend themselves to easily appropriable rents, while it is more difficult to extract rents from other commodities (see the articles and literature summary in Auty 2001).<sup>4</sup> An intuitive dividing line here might be the distinction between food grains, where the farmers could limit any attempt to tax them excessively by simply eating their own crops, and cash crops and minerals, that must be traded internationally and hence are vulnerable to governments and traders capturing rents.<sup>5</sup>

This latter distinction may be particularly relevant for Africa, where many of the cash crops were taxed heavily through the use of government marketing boards to which the governments compelled farmers to sell (one form of many possible rent-seeking policies). The rents captured through marketing boards generally went to the political and economic elite, increasing or reinforcing existing inequality. The low rate of European immigration into Africa because of high mortality may also have prevented the dilution of the power and income

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<sup>4</sup> Bourguignon 1993 and Gylfason 2001 are among previous papers showing an empirical association between commodity resource endowments (captured by a summary measure) and inequality.

<sup>5</sup> Woolcock, Pritchett, and Isham 2001 make the distinction between “diffuse” and “point-source” production of commodities; they do not find strong differences in inequality between the two types of commodity production (except for land inequality). However, this distinction is difficult to draw in practice, since commodities with diffuse production may still have to pass through a government-controlled marketing board or trading ports, where rents could be captured. Also diffuse production could still be



concentration in the hands of pre-existing elites and a few small immigrant groups like the Lebanese in West Africa or the Indians in East Africa. In the case of mineral exports, the rents were usually captured by a state-owned enterprise that controlled mineral production and funneled money to the political and economic elite. As in the ES story, the African elite benefiting from these rents would oppose mass investment in human capital, institutional constraints on rent-seeking, and democracy so as not to threaten their power and their capture of rents. In contrast, many authors have pointed to East Asia's lack of cash crops and mineral resources, low inequality, and high investment in human capital as a secret to its success.<sup>6</sup>

Next three examples. An example of inequality repressing development and undermining institutions is the Mexican state of Chiapas, where the Zapatista rebellion that broke out on January 1, 1994 was only the latest installment in a long-running conflict between landowners and peasants. The quote by Castellanos at the beginning of the paper summarizes the income distribution in Chiapas. The quote is all the more poignant since Castellanos himself belonged to an old and wealthy landowning family and, as a military man, was involved in an army massacre of peasants in 1980.<sup>7</sup> Landowners run coffee, cotton, and sugar plantations with peasant labor. Many observers have noted the "sordid association" among landowners and their *pistoleros*, party bosses, the army, and the police, all of whom agree on the use of force to repress peasant rights (for example, depriving peasants of land to which they are legally entitled). Amnesty International noted "a pattern of apparently deliberate political killings" of supporters and leaders of independent peasant organizations. At one point, four successive leaders of the peasant organization *Casa del Pueblo* were assassinated.

In the Northeast of Brazil, a centuries-old sugarcane industry was associated with high inequality, low human capital, and general underdevelopment (the "major underdeveloped region in the Western Hemisphere.") The sugarcane plantation (including the all important sugar mill)

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historically characterized by economies of scale and use of slave labor, so the ES arguments could still go through.

<sup>6</sup> See for example Birdsall, Ross, and Sabot 1995 and World Bank 1993.

was owned by Europeans. The labor force consisted of African slaves; after emancipation in 1888, the labor force has consisted of their descendants. The landowners supported professional and agricultural schools but opposed mass education. As late as 1960, three-fourths of the adult population of the Northeast was illiterate and less than 3 percent finished primary school. Populist politicians came to power in the Northeast in the early 60s, but their redistributive measures were reversed after Brazil's military coup in 1964.<sup>8</sup> The backwardness of the Northeast has proven resistant to aid programs by both the Brazilian government and outside agencies like the World Bank, which has funded development programs in the Northeast since the 1970s. A 1997 World Bank review noted that development programs in the Northeast were "unable to achieve their original objectives."<sup>9</sup> As of the most recent studies, the poverty rate in Northeast is more than 5 times that in Sao Paulo (Fiess and Verner 2001).

In Sierra Leone, the middle sixty percent of the population gets only 33.7 percent of total income (close to the lowest in the world). Sierra Leone is abundantly endowed with commodities like rice, diamonds, sugar cane, coffee, and palm oil. According to Conteh-Morgan and Dixon-Fyle (1999), Sierra Leone has disastrously poor institutions, as successive governments have ridden roughshod over any institutional checks and balances in their drive to keep power and to keep access to commodity rents. The political elite has often colluded with the economic elites of the Krio (descendants of freed slaves in Freetown) and the Lebanese (also in Freetown) to capture commodity income. Historically, the Freetown elite captured commodity rents from the interior; although chiefs and big traders in the interior began to share in the rents in the 20<sup>th</sup> century. Sierra Leone has extremely low human capital, is among the poorest nations in the world, and since 1991 has descended into an atrocious civil war that has been fueled by competition for control of commodity rents.

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<sup>7</sup> p. 246-247, Benjamin 1996.

<sup>8</sup> This description and the quote are from Taylor 1978.

<sup>9</sup> World Bank, Implementation Completion Report, Northeast Rural Development Program, 1997 (Report No. 16765)

## *I. Literature review*

Whether a high initial level of inequality hinders economic development is one of the most highly contested questions in the recent literature on economic growth and development. Unlike much empirical growth research, theory and a priori testable mechanisms have in part guided the inequality and growth literature. The three principal mechanisms that researchers have proposed have been redistributive policies, quality of institutions, and human capital. The first wave of the recent literature saw high inequality lowering growth because the poor majority would vote for redistributive rather than growth-enhancing policies (Alesina and Rodrik 1994 and Persson and Tabellini 1994). A variant of the redistributive hypothesis in which distributive politics flows in the other direction is that the rich elite will extract rents from the poor majority, lowering the incentive of the majority to invest in the future (ES).

The institutional mechanism proposed is that a rich elite will suppress democracy and equal rights before the law so as to preserve their privileged position. (ES, Bourguignon and Verdier 2000). Inequality could also lead to politically unstable institutions as power swings back and forth between redistributive populist factions and oligarchy-protecting conservative factions (Perotti 1996, Benabou 1996), and political instability itself lowers growth (Alesina et al. 1996). The idea that inequality promotes factionalism and instability goes back to James Madison, who noted in 1787 that “the most common and durable source of factions has been the various and unequal distribution of property,” or even further back to Aristotle, who noted in 306 BC that “where the middle class is large, there are least likely to be factions and dissension.”

The human capital mechanism is that imperfect capital markets will prevent human capital accumulation by the poor majority (Galor and Zeira 1993, Perotti 1996, Birdsall 2001). Assortative matching between marriage partners will make this problem worse (Fernandez, Guner, and Knowles 2001). Alternatively, the rich elite will not want to invest in human capital of the majority because it increases their potential political activism and hence threatens the elite’s hold on power (ES, Bourguignon and Verdier 2000).

Most of the empirical testing of the inequality-causing-development hypothesis has centered on reduced forms rather than structural relationships, despite the clear specification of mechanisms. Whether in fact a reduced form negative relationship holds between inequality and growth has been hotly contested. The first studies in the recent wave of literature did find a relationship (Alesina and Rodrik 1994, Persson and Tabellini 1994, Clarke 1996). These findings offered a partial explanation for the stylized fact that growth had been high in egalitarian East Asia and low in unequal Africa and Latin America (Birdsall, Ross, and Sabot 1995). Perotti 1996 challenged some of the mechanisms allegedly at work in these findings (e.g. he found no evidence for higher tax rates in more unequal societies), but did find a relationship between inequality and growth through political instability and human capital. A challenge to this literature came from researchers who exploited the panel dimensions of the data (Forbes 2000, Barro 2000, Banerjee and Duflo 2000). These authors found a zero, nonlinear, or even positive relationship between inequality and growth. The positive relationship of Forbes 2000 would seem to confirm a long tradition in economic thought of beneficent inequality that concentrates income among the rich who save more and increases the incentive to work hard to move up the ladder (see review in Birdsall 2001). However, there is some question as to whether panel methods using relatively high frequency data are the appropriate test of a relationship whose mechanisms seem to be long run characteristics that are fairly stable over time.

Another challenge to the literature comes from Lundberg and Squire 2001. They argue that inequality is an endogenous variable jointly determined with growth and hence one cannot expect a stable relationship between the two.

Another criticism of the literature has been the poor quality of the data on inequality. The first wave of results was challenged on these grounds of poor data quality by Deininger and Squire (1996, 1998), who offered a new expanded and higher quality dataset. However, Deininger and Squire still found land inequality to depress growth in their new higher quality data sample. More recently, the Deininger and Squire data themselves have come under attack

(Atkinson and Brandolini 1999). Even the Deininger and Squire inequality data are derived from several different methodologies, including individual vs. household, income vs. expenditure, and pretax vs. post-tax. Given the importance of inequality research, it would clearly be desirable to invest more resources in constructing a higher quality and consistent dataset covering a large number of countries. In the meantime, the problems of measurement error in the existing dataset could be addressed by instrumental variables.

The lessons of the previous literature seem to be that one should use the more comprehensive dataset of Deininger and Squire, one should clearly specify mechanisms by which inequality affects growth or development, one should examine long run tendencies, and one should find exogenous instruments for inequality in assessing its causal impact on development. Instrumenting for inequality will also address problems in data quality in the inequality numbers.

The specification of mechanisms by the inequality literature is helpful because it allows us to test the inequality hypothesis against other determinants of economic development that have been proposed in the literature. Schooling, redistributive policies, and institutions have all been proposed as central determinants of economic development, with these in turn depending on exogenous country characteristics. Hall and Jones 1999 suggest that redistributive policies are part of the “social infrastructure” that determines why some countries produce more output per worker than others. They use the Sachs-Warner 1995 measure of openness as an indicator of redistributive policy and instrument for it with distance from the equator and percent of speakers of European languages. Frankel and Romer 1999 argue that openness per se has a strong effect on per capita income, instrumenting for openness with a country’s natural propensity to trade based on the gravity model.

Acemoglu, Johnson, and Robinson 2001 (AJR) suggest institutional quality as a fundamental determinant of economic development, instrumenting for institutions with mortality rates facing European settlers in the colonial era. AJR characterized settler colonies as producing institutions that facilitated broad-based development, while non-settler colonies adopted

extractive institutions that were designed to capture the rents for the colonizers. Hall and Jones 1999 use institutional quality as the other component of their “social infrastructure”, with latitude and European language again as instruments. Easterly and Levine 1997 and Mauro 1995 suggested ethnic fractionalization led to poor institutional outcomes.<sup>10</sup>

Finally formal schooling is argued to be a fundamental determinant of output per worker in a literature that began with Easterlin (1981) and continued with Mankiw-Romer-Weil (1992) and Mankiw (1995). Easterly and Levine 1997 and Alesina, Baqir, and Easterly 1999 argue that schooling is affected by ethnic fractionalization because of the difficulty of different ethnic groups agreeing on the type and quality of public services.

Finally, some papers relate level of development or growth directly to exogenous country characteristics. Easterly and Levine 1997 relate growth and per capita income directly to ethnolinguistic fractionalization. Sachs and Warner (1995, 1997) suggest that tropical location, landlocked location, and natural resource exporting directly inhibit development or growth. The “natural resource curse” has its own large literature, in which natural resource endowments retard development, recently summarized and extended by Manzano and Rigobón (2001) and Auty (2001).

This paper, like others in the literature, will relate the level of development to institutions, openness, and schooling. It will relate these three mediating mechanisms to inequality, instrumented by commodity endowments, controlling for the other exogenous country characteristics that previous authors have put forward. It will also test for direct effects of inequality, demographic, and geographic characteristics on level of development, controlling for the mediating mechanisms of institutions, openness, and schooling. This setup allows us to run a “horse-race” between the different fundamental determinants of development. The results are that inequality has a strong negative effect on all three mediating mechanisms of economic

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<sup>10</sup> Woolcock, Isham, and Pritchett 2001 found that institutions are worse in resource-rich than in resource-poor economies, and that “point-source” and coffee and cocoa resources were associated with worse

development. The instruments for inequality pass standard tests of overidentifying restrictions.

These results are robust to a number of alternative specifications.

## *II. Empirical results*

Based on the previous literature and the ambition of this paper to test the effects of inequality against competing hypotheses, I will estimate a system of equations as follows:

Inequality = f(Commodity endowments, European settler mortality)

Institutions = g(Inequality, European Settler Mortality, Ethnic fractionalization, Distance from the Equator)

Openness = h(Inequality, Frankel-Romer natural openness, Ethnic fractionalization)

Schooling = j(Inequality, Ethnic fractionalization)

Per capita income = k(Institutions, Openness, Schooling)

The specifications are given by nesting hypotheses from the literature cited above. When two different studies use a similar concept but a slightly different variable, then I adopt the most plausibly exogenous variable of the two. For example, Hall and Jones use fraction of the population speaking a European language as their instrument for good institutions, while Acemoglu, Johnson, and Robinson use mortality rates facing European settlers in the 18<sup>th</sup> and 19<sup>th</sup> century in different colonies for such an instrument. I prefer the latter, since it is lagged further back in time and is less likely to reflect reverse causality from people with good institutions having an incentive to learn a European language.<sup>11</sup>

My measures of resource endowments are dummies for whether a country produced any of a given set of leading commodities in 1998-1999. (Table 1 summarizes the descriptive

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institutions compared to “diffuse” resource economies. Isham, Pritchett, Woolcock, and Busby 2001 find worse institutions in resource-rich relative to resource poor countries.

<sup>11</sup> La Porta et al. 2000 alternatively link the quality of government institutions to legal origins, with French legal origin having a negative effect on institutions, but do not pursue the link from quality government to economic development. La Porta et al. 1998 find that legal origin influenced financial institutions. Levine 1999 found that legal origin helped explain financial intermediary development. Levine, Loayza and Beck 2000 and Beck, Levine, and Loayza 2000 found that using legal origin as an instrument for finance helped identify the causal effect of financial development on GDP growth, investment, and productivity growth. I tried including French legal origin as another measure of institutional quality, but did not find it to be

statistics on all variables used in the paper.) For example, the dummy WHEAT takes on the value 1 if the Food and Agriculture Organization (FAO) records the country as producing any wheat in 1998-1999 and 0 otherwise. These dummies are arguably exogenous since they reflect simply whether the land endowment makes it possible to produce wheat. Harlan 1992 (pp. 53-60) discusses the botanical mechanisms by which different ecological zones are compatible with some types of crops and not with others. The quantity of wheat produced would endogenously respond to price incentives, institutions, and other country characteristics, but whether ANY wheat is produced is more likely to reflect exogenous characteristics like soil and climate (in any case I will test an even more exogenous measure of soil and climate below). These characteristics have thus plausibly remained constant over time, and hence reflect agricultural endowments, which in turn reflects historical conditions for inequality.

I adopt the same convention for mining commodities, with the data on production coming from the World Bureau of Metal Statistics. Using commodity endowments as instruments seems like a natural instrument to use to test the ES hypothesis that certain commodities lent themselves to economies of scale and the use of slave labor, while others lent themselves to production by middle class family farmers. I chose the particular list of commodities shown in table 1 (from the more than a hundred possible primary commodities in the data) based on my random priors as to what were important commodities in many countries' economic history, either because they were mentioned by ES or because of my knowledge of country case studies. I did not do any specification searches to choose the basket of commodities.

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significant. Probably further research is warranted on legal origin as a deep fundamental affecting development.



**Table 1: Summary Statistics of variables used in paper**

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
<i>Measure of inequality:</i>						
Income share of middle three quintiles (average 1960-96)	46.71	48.04	57.70	30.00	7.11	103
<i>Dummies for producing any of the following commodities in 1998:</i>						
BANANAS	0.54	1.00	1.00	0.00	0.50	205
COFFEE	0.36	0.00	1.00	0.00	0.48	205
COPPER	0.22	0.00	1.00	0.00	0.41	205
MAIZE	0.76	1.00	1.00	0.00	0.43	205
MILLET	0.36	0.00	1.00	0.00	0.48	205
OIL	0.23	0.00	1.00	0.00	0.42	205
RICE	0.55	1.00	1.00	0.00	0.50	205
RUBBER	0.13	0.00	1.00	0.00	0.34	205
SILVER	0.23	0.00	1.00	0.00	0.42	205
SUGARCANE	0.49	0.00	1.00	0.00	0.50	205
WHEAT	0.59	1.00	1.00	0.00	0.49	205
<i>Other exogenous variables</i>						
Log of European settler mortality per 1000, 18 <sup>th</sup> -19 <sup>th</sup> century	4.66	4.44	7.99	2.15	1.23	78
Dummy for landlocked	0.19	0.00	1.00	0.00	0.39	210
Absolute latitude/90	0.28	0.21	0.71	0.00	0.18	204
Log of Frankel-Romer Natural Openness Variable, 1985	2.98	3.03	5.64	0.83	0.80	149
<i>Endogenous variables</i>						
Institutional quality 1998 (Kaufmann et al. 2000)	-0.03	-0.14	1.72	-2.02	0.83	174
Fraction of years open according to Sachs-Warner 1960-94	0.33	0.20	1.00	0.00	0.34	130
Log of average years of schooling of labor force (average 1960-90)	1.12	1.29	2.39	-0.98	0.81	110
Log of GDP per capita in 1990	8.19	8.24	10.03	5.99	1.02	152
Per capita GDP growth 1960-97	0.029	0.027	0.077	-0.012	0.017	103

My preferred measure of inequality is the share of income accruing to the middle class (specifically the share in total income of the middle three quintiles averaged over 1960-96), as in an earlier paper (Easterly 2001).<sup>12</sup> Deininger and Squire 1996 showed that this variable was

<sup>12</sup> That earlier paper also tested the effect of inequality of development with a system predicting commodity exporting by tropical location and predicting middle class share with commodity exporting, then estimating

highly persistent over time, so the cross-section distribution in inequality in the last few decades is likely to reflect the cross-section distribution from earlier periods. Lindert and Williamson 2001 argue in a broad survey that there is no systematic tendency for within-country inequality to change over the last two centuries. Lindert 2000 finds that sketchy data suggest that the Gini for income inequality in England in the 17<sup>th</sup> and 18<sup>th</sup> centuries was roughly the same as in 1995, although it fluctuated in between. Likewise, he finds the wealth inequality Gini in the US was about the same order of magnitude in 1983 as in 1776.

The middle class variable seems to capture the distinction that ES have in mind between a middle class society (North America) and a society split between the elite and the poor majority, with little in the way of a middle class (Latin America). In any case, the middle class variable is highly correlated with other measures of inequality or social stratification. The middle class share has a correlation of -.91 with the Gini coefficient. The middle class share has a correlation of -.65 with the degree of marital sorting (the degree of correlation in household surveys between spouses' educational attainment, from Fernandez et al. 2001).<sup>13</sup> Finally, there might be concern the middle class share could go up at the expense of the bottom quintile, representing higher rather than lower inequality. However, the share of the top quintile has a correlation of -.99 with the middle class share – empirically variations in the middle class share are due virtually entirely to variations in the top quintile and not in the bottom quintile.

My measure of institutions is the comprehensive indicator developed by Kaufmann, Kraay, and Zoido-Lobaton 2000a (KKZ). This measure summarizes the information contained in more than 300 indicators of institutional quality using the method of unobserved components,

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an equation for income and growth as a function of middle class share and ethnic fractionalization (the “middle class consensus”). The present paper takes these preliminary results much further by specifying an instrument set that is richer and more plausibly excludable from the income equation, by estimating the intermediating mechanisms as a function of the middle class share, and by running a “horse race” with other competing determinants hypothesized by the previous literature.

<sup>13</sup> I use the entire Deininger and Squire dataset, in contrast to the practice of many authors of using just the “high quality” subset of the dataset. Atkinson and Brandolini 1999 argue that many observations excluded from the “high quality” dataset by Deininger and Squire have just as good a claim at being good measures as those classified as “high quality.” I take the approach that will maximize sample size and then address measurement error through instrumental variables.

correcting for selection bias. They derive six indicators of institutional quality: government efficiency, corruption, political instability, regulatory burden, rule of law, and democracy. I average over their six measures to derive a single indicator of institutional quality. KKZ 2000b themselves found strong effects of institutional quality on per capita income and literacy. Institutional quality is another variable that is usually thought to be persistent over time, and so today's values likely also reflect earlier cross-section differences (the case studies in ES document how far back the institutional differences between North America and Latin America go).

My measure of openness is the fraction of years a country is defined as open over 1950-95 by Sachs and Warner 1995. This is also the measure used by Hall and Jones 1999; like those authors I interpret the measure as a general indicator of rent-seeking or redistributive policy rather than of trade policy per se. Sachs and Warner define a country as open if (i) nontariff barriers cover less than 40 percent of trade, (ii) average tariff rates are less than 40 percent, (iii) the black market premium was less than 20 percent during the 1970s and 1980s, (iv) the economy is not socialist, and (v) the government does not control major exports through marketing boards.

My measure of schooling comes from the average over 1960 to 1990 of the Barro and Lee (1993) data, which measures the average years of schooling in the adult population. My measure of level of development is per capita income in 1990 from Summers and Heston 1993.

I estimate the system of equations specified above jointly using three stage least squares. As always, there are benefits and costs from using a system estimator. The benefit is that a system estimator is more efficient than a single equation estimator. It also gives a more accurate estimate of the standard errors when we control for a possible association of the error term in the middle class share equation and that in the other equations. The disadvantage of the system estimator is that any specification error in one equation will be propagated to the other equation. I will attempt to deal with this problem in the robustness checks.

Table 2 shows the basic results of estimating the system of equations specified above with three-stage least squares. Commodity endowments have substantial explanatory power for the middle class share. Confirming the ES hypothesis, silver and sugar cane endowments significantly lower the middle class share, while maize endowments increase it. Wheat does not have an effect on middle class share, failing to confirm the ES prediction. Maize has a large effect on the middle class share, increasing it by 10 percentage points. Rice, which ES suggest has some scale economies, has a large negative effect on the middle class share. Confirming the food grains hypothesis, millet endowments increase the middle class share.

Confirming the ES hypothesis on the effect of European migration on inequality, high settler mortality significantly lowers the middle class share. Countries that had a discouraging environment for European immigration, because of the disease environment or perhaps also because of policy restrictions, had a shrunken middle class.

In the succeeding equations, I test the effect of inequality on the intermediating mechanisms for economic development suggested above, using the commodity endowments and settler mortality variables as instruments for the middle class share. The institutions equation tests the inequality hypothesis for institutional determination against the alternative hypotheses of colonial history (entering settler mortality directly as in AJR), distance from equator (Hall and Jones 1999), and ethnic fractionalization (Mauro 1995, Easterly and Levine 1997). I find no evidence to support the distance from equator as a direct determinant of institutional quality. I do find evidence that ethnic fractionalization and colonial history (settler mortality) matter for institutional quality, confirming the earlier studies just cited. However, the effect of the middle class share on institutions is strongly significant controlling for these factors.

The next equation tests alternative determinants for my proxy for rent-seeking or redistributive policy, Sachs-Warner openness. Both of the competing hypotheses of “natural openness” (Frankel-Romer measure based on the gravity model of trade) and ethnic fractionalization (Easterly-Levine) are indeed statistically significant determinants of openness.

The middle class share, however, is a positive and statistically significant determinant of openness or redistributive policies. More middle class societies eschew rent-seeking policies like tariffs, quotas, black market premiums, and state-owned export marketing boards (all components of the Sachs-Warner measure).

The third equation tests schooling as a function of the middle class share and ethnic fractionalization. Both are statistically significant.

Finally, the last equation relates a country's level of development (per capita income in 1990) to institutional quality, openness, and schooling, instrumenting for these variables with the predetermined variables from the earlier equations. Openness is positive but insignificant as a determinant of development. However, both institutional quality and schooling are highly significant determinants of development.

<b>Table 2: System of equations for middle class share, institutions, policy, schooling, and income</b>				
Estimated as a system with generalized method of moments				
	Coefficient	Std. Error	t-Statistic	Prob.
Dependent variable: Share of 3 middle income quintiles				
Constant	50.17	1.15	43.76	0.00
Bananas	-2.14	1.10	-1.93	0.05
Coffee	0.80	1.26	0.64	0.53
Copper	-1.17	0.81	-1.45	0.15
Maize	10.28	0.61	16.83	0.00
Millet	3.44	0.73	4.67	0.00
Oil	2.73	0.66	4.16	0.00
Rice	-6.22	0.91	-6.86	0.00
Rubber	0.00	0.65	0.00	1.00
Silver	-2.53	0.84	-3.02	0.00
Sugar Cane	-3.06	1.17	-2.62	0.01
Wheat	0.04	1.06	0.03	0.97
Settler Mortality	-1.80	0.30	-5.99	0.00
Observations: 53				
Dependent variable: Institutional quality 1998				
Constant	0.641	0.280	2.29	0.02
Middle Quintiles	0.024	0.006	4.32	0.00
Ethnic Frac.	-0.004	0.001	-3.27	0.00
Settler Mortality	-0.356	0.025	-14.53	0.00
Distance from equator	0.178	0.251	0.71	0.48
Observations: 53				
Dependent variable: Fraction of years open according to Sachs-Warner 1960-94				
Constant	-0.5832	0.2859	-2.04	0.04
Frankel-Romer Openness Propensity	0.0615	0.0278	2.21	0.03
Middle Quintiles	0.0174	0.0059	2.95	0.00
Ethnic Frac.	-0.0014	0.0005	-2.65	0.01
Observations: 53				

Table 2 (continued)				
Dependent variable: Log years of schooling of labor force (average 1960-90)				
Constant	-1.297	0.403	-3.22	0.00
Middle Quintiles	0.065	0.009	7.13	0.00
Ethnic Frac.	-0.011	0.002	-6.68	0.00
Observations: 45				
Dependent variable: Log of GDP per capita in 1990				
Constant	7.21	0.10	68.94	0.00
Institutions	0.61	0.09	6.63	0.00
Sachs-Warner Years Open	0.30	0.17	1.80	0.07
Log Schooling	0.69	0.10	6.87	0.00
Observations: 56				
Predetermined variables: Bananas, Coffee, Copper, Maize, Millet, Oil, Rice, Rubber, Silver, Sugar Cane, Wheat, Settler Mortality, Ethnic fractionalization, Distance from equator, Frankel-Romer Openness Propensity, Landlocked dummy				

How much does inequality matter as a determinant of development? A one standard deviation increase in the middle class share ( 7.1 percentage points) raises institutional quality by .2 standard deviations, openness by .4 standard deviations each and schooling by .6 standard deviations (Table 3). These effects of a one standard deviation increase in middle class share raise development level by .43 standard deviations (or an increase of 59 percent in per capita income). Moving from the minimum to the maximum middle class share in the data (an increase of 27.7 percentage points) would raise income per capita by a factor of 6, which spans roughly half the range of income per capita in the data. The amount by which inequality hinders development is economically meaningful as well as statistically significant.

<b>Table 3: Effect of one standard deviation increase in middle class share</b>			
	Magnitude	#standard deviations	Percentage increase in unlogged variable
Effect of one standard deviation increase in middle class share (7.1 percentage points) on:			
Institutions	0.172	0.207	
Openness	0.124	0.363	
Log Schooling	0.465	0.572	59%
Effect on income through:			
Institutions	0.104	0.102	11%
Openness	0.037	0.036	4%
Log Schooling	0.323	0.315	38%
Total	0.464	0.453	59%

Are the instruments truly excludable from each equation? To address this question, I perform a standard test of overidentifying restrictions. I fail to reject the overidentifying restrictions in all equations at the 5 percent level in all equations. Only in the middle class share equation is the rejection close to being significant (.057). The p-values for the institutions, openness, schooling, and per capita income equations fall well short of significance (.18, .25, .72, and .17, respectively). This paper confirms the similarly parsimonious approaches used in Hall



and Jones 1999, Frankel and Romer 1999, and AJR 2001, but nests their hypotheses together and introduces inequality as a new determining variable of economic development.

The failure to reject the overidentifying restrictions also suggests that there is no significant evidence at the 5 percent level that such predetermined variables as a “natural resource curse” or “tropics curse” (measured here as distance from the equator) affect income or its proximate determinates directly.<sup>14</sup> Commodity endowments apparently affect institutions, schooling, and income through their effect on inequality. The distance from the equator variable is not significant in the institutions equation nor can the overidentifying restriction that it be omitted from the income equation be rejected. The association between economic development and distance from the equator appears to reflect the effect on inequality of differing commodity endowments at different latitudes, as ES suggest.

One other type of exclusion restriction I test is whether the middle class share has any direct effect on income, once the channels of institutions, openness, and schooling are accounted for. I find no significant effect and the variable is the “wrong” sign, so these channels by which the theory predicts inequality affects development do seem to capture its effects.

Given that much of the previous literature estimated an inequality and growth relationship, it’s also of interest to estimate the system as a system in growth rates of per capita incomes, rather than levels. We could think of a dynamic system where a country’s growth rate would be high if its level of institutions, openness, and schooling were high relative to where its initial income was at the beginning of the period. Table 4 shows the growth equation estimated as part of the same system specified in Table 2 above; I do not report the rest of the system since the results are very similar.

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<sup>14</sup> I also threw in the landlocked dummy of Sachs and Warner into the instruments for good measure and found no evidence that it had an independent effect on anything except insofar as it affected inequality.

**Table 4: Growth regression as part of GMM system of equations**

	Coefficient	Std. Error	t-Statistic	Prob.
Dependent variable: Per capita GDP growth 1960-1997				
Constant	0.1157	0.0171	6.77	0.000
Log Income, 1960	-0.0146	0.0027	-5.41	0.000
Institutions	0.0114	0.0022	5.18	0.000
Sachs-Warner Years Open	0.0227	0.0044	5.22	0.000
Log Schooling	0.0100	0.0039	2.57	0.011
Observations: 51				

The results for growth rates are in line with the previous literature. Institutional quality, openness, and schooling now all have a significant positive effect on growth; initial income has a significant negative effect. This confirms the dynamic prediction that countries will grow faster if the determinants of per capita income (institutions, openness, schooling) would support a higher level of development than their initial per capita income. The significance of openness, in contrast to the level results, is interesting. However, most importantly for the present paper, the effects of fundamental determinants of development are plausibly causal, because they are significantly related to other exogenous determinants of development and to middle class share, which is in turn related to commodity endowments. The hypothesis that the overidentifying restrictions hold fails to be rejected by a large margin (p-value of .61), so again there is no evidence of a direct effect of commodity endowments or tropical location. A one standard deviation increase in the middle class share (7 percentage points) would raise growth over 1960-97 by about one percentage point according to these coefficient estimates, which is about .6 standard deviations.

First, I consider alternative estimation methods. Using single-equation GMM for each equation leaves the results on inequality unchanged, so the system estimation is not crucial to the results. For the system, three-stage least squares also gives the same results on the effects of inequality on institutions, openness, schooling, income and growth. The 3SLS coefficients tend to be estimated less precisely than the GMM estimates, particularly the effects of commodity

dummies on the middle class share. However, the middle class share continues to be significant in all the 3SLS equations.

My next robustness check is to exclude AJR's European settler mortality variable from the system. This variable restricts the sample because it does not include data on the European nations who were themselves the colonizers; this reduces the variance of the variables since we are leaving out some of the most developed nations. Hence, it is important to test if the basic results go through when Europe is included, even if it creates an omitted variable problem.

Although the omission of the settler mortality variable changes the magnitudes and significance of the commodity determinants of inequality (in particular the maize coefficient is no longer significant), the results on middle class share affecting institutions, openness, and schooling are unchanged. The effects of institutions and schooling on development also remain significant, so the basic story remains unchanged. Openness is also now significant in the income equation, so the extra information provided by the sample expansion seems to be helpful in identifying this effect.

Next I address possible concerns about the endogeneity of the crop dummies. I have data from the FAO about the percent of national land area suitable for different crops, taking into account such factors as soil, rainfall, temperature, and elevation.<sup>15</sup> While this measure is a less precise measure than the crop dummies of potential for different crops since it is a technical guess as to whether certain land areas are "suitable," it is arguably more exogenous than the crop dummies. This land suitability measure is available for bananas, maize, millet, sugarcane, rice, and wheat. I continue to use crop dummies for coffee and rubber, on which land suitability data is unavailable, and of course for the minerals. Because the land suitability data reduces the sample size, I do the exercise on the full dataset excluding the settler mortality variable. The results are shown in Table 5. The results on the determinants of middle class share are somewhat different, with bananas and wheat now significant and positive, and maize no longer significant. However,

silver, sugarcane, and rice continue to have a negative effect on middle class share, as they did in Table 2. With the new significance of wheat and the continued significant negative effects of silver, sugarcane, and rice, the ES hypothesis continues to receive support. The other results continue unchanged except that the Frankel-Romer instrument is no longer a significant determinant of openness. Note that as in the previous paragraph, openness is now significant in the income equation. Most importantly, I still get the result that the middle class share, properly instrumented, is a significant determinant of development through the channels of institutions, openness, and schooling.

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<sup>15</sup> Food and Agriculture Organization, Global Agro-Ecological Zones 2000, Web site <http://www.fao.org/ag/AGL/agll/gaez/index.htm>

**Table 5: Substituting land suitability for crop dummies**

Estimation method: GMM	Coefficient	Std. Error	t-Statistic	Prob.
Dependent variable: share of middle 3 quintiles				
Constant	47.36	0.68	70.03	0.000
% of land suitable for bananas	91.17	17.12	5.33	0.000
% of land suitable for maize	9.81	8.26	1.19	0.236
% of land suitable for millet	-21.41	13.75	-1.56	0.120
% of land suitable for rice	-10.82	3.61	-3.00	0.003
% of land suitable for sugarcane	-85.36	17.82	-4.79	0.000
% of land suitable for wheat	16.85	4.20	4.01	0.000
Coffee dummy	-5.10	1.31	-3.89	0.000
Copper dummy	-0.99	1.11	-0.89	0.374
Oil dummy	0.31	0.94	0.33	0.743
Rubber dummy	4.16	1.01	4.13	0.000
Silver dummy	0.11	0.99	0.11	0.909
Observations	77			
Dependent variable: Average quality of institutions (KKZ, 1998)				
Constant	-1.491	0.423	-3.53	0.001
Middle Quintiles	0.024	0.010	2.34	0.020
Ethnic Frac.	-0.003	0.001	-2.56	0.011
Distance from equator	2.527	0.310	8.15	0.000
Observations	77			
Dependent variable: Fraction of Years Open According to Sachs-Warner (1960-1995)				
Constant	-1.1668	0.202	-5.78	0.000
Frankel-Romer Openness Propensity	0.0003	0.023	0.01	0.990
Middle Quintiles	0.0353	0.004	9.27	0.000
Ethnic Frac.	-0.0013	0.001	-1.86	0.064
Observations	77			
Dependent variable: Log of schooling 1990				
Constant	-1.636	0.416	-3.93	0.000
Middle Quintiles	0.069	0.008	8.24	0.000
Ethnic Frac.	-0.006	0.002	-3.39	0.001
Observations	81			

Table 5 continued

Dependent variable: Log of GDP 1990	Coefficient	Std. Error	t-Statistic	Prob.
Constant	6.909	0.129	53.51	0.000
Institutions	0.408	0.107	3.82	0.000
Sachs-Warner Years Open	0.734	0.226	3.25	0.001
Log Schooling	0.904	0.115	7.87	0.000
Observations	81			

Predetermined variables:

% land suitable for Bananas, Maize, Millet, Rice, Sugarcane, Wheat, Dummies for Coffee, Copper, Oil, Rubber, Silver, Continuous variables for Ethnic Fractionalization, Distance from Equator, Frankel-Romer Openness Propensity

Could it be that this is all an elaborate exercise to say that Latin America and Africa are poor while Europe and the so-called neo-Europes (North America, Australia, New Zealand) are rich? I add dummies for Africa and Latin America to the income equation in the above system. I also add the Hall and Jones variable for fraction of the population speaking a European language. Only the Africa dummy is statistically significant (with a magnitude of  $-.27$ ) out of these three variables. The European language variable does particularly badly with a statistically insignificant coefficient of only  $.029$ . Although the openness variable is rendered insignificant, the institutions and schooling variables remain highly significant in the income equation. The basic story on inequality affecting development through institutions and schooling remains unchanged.

When I enter these same additional three variables (Africa and Latin America dummies, fraction speaking a European language) into a growth equation system like that specified above, again only the Africa dummy is significant (with a coefficient of  $-0.006$ , which is lower than the usual magnitude of  $-.02$  in growth regressions). In the growth equation system, institutions, openness, and schooling all remain significant controlling for these three variables.

My next robustness check is to examine whether the Gini coefficient measure of income inequality or the Gini coefficient of land distribution performs the same way in the system as the

middle class share did. I continue to use the larger sample because of the smaller sample for the land Gini. Commodity endowments continue to have some explanatory power for inequality, although the coefficients and significance shift around. The significant commodity dummies for predicting the income Gini are now rice and coffee (both increasing inequality). The income Gini coefficient measure of inequality, instrumented by commodity endowments, continues to predict institutional quality, openness, and schooling at a high level of statistical significance, and all of these variables are significant for predicting level of development. Using the land Gini gives different results for what determines inequality. Now oil, bananas, coffee and maize significantly increase land inequality, while millet, rice, and rubber significantly lower it. The commodity dummies seem to have different effects on different types of inequality. As far as the channels of transmission, the land Gini (instrumented with commodity dummies) affects only the openness variable, which is itself significant in this system as a determinant of development level. Although the results with other inequality measures continue to suggest inequality matters for economic development, the middle class share variable seems to be more consistent with the hypotheses laid out in the ES story.

Next, I look into the institutional quality variable in more detail. Analogously to the exercise performed by Kaufmann et al. (1999), I estimate the system of equations from Table 2 using the six different measures of institutional quality one at a time. I do this with both the equation that treats institutional quality as an endogenous variable, and the equation that links per capita income to institutional quality. The middle class share is not a good predictor of government regulation, but is a statistically significant predictor of government efficiency, corruption, political instability, rule of law, and democracy. These latter variables seem close to the mechanisms specified in the ES hypothesis and other stories that I give above. All of the institutional variables are individually significant in the per capita income equation.

Finally, I examine the question of reverse causality going from income to inequality. The literature examining the effect of development level on inequality is even larger than that

examining the effect of inequality on development. Could the positive association between middle class share and per capita income reflect reverse causality, such as the downward sloping section of the Kuznets curve between development and inequality? The most recent literature either finds no systematic evidence of a Kuznets curve or any other relationship between level of development and inequality (Deininger and Squire 1998, Bruno, Ravallion, and Squire 1998, Ravallion 1995, 1997, Anand and Kanbur 1993). The traditional confirmation of the Kuznets curve is now generally held to have been based on earlier, flawed data and restrictive functional forms; if anything, the literature now finds a monotonic negative relationship between income and inequality. I showed in the introduction that the simple association between middle class share and per capita income is positive and monotonic.

Nevertheless, it is still important to check if this association could reflect reverse causation from level of development to the middle class share. Table 6 shows the system with the log of per capita income entered into the middle class share equation. Income is identified in the middle class share equation by ethnic fractionalization, distance from equator, and Frankel-Romer natural openness. The coefficient on income in the middle class share equation is the right sign but has a low t-statistic. Income does seem to knock out the significance of the settler mortality variable. Moreover, controlling for reverse causality leaves the magnitude and significance of the effect of inequality on development through the channels of institutions, openness, and schooling unchanged.



**Table 6: System of equations for reverse causality from income to middle class share**

Generalized method of moments				
	Coefficient	Std. Error	t-Statistic	Prob.
Dependent variable: Share of 3 middle income quintiles				
Constant	37.48	17.49	2.14	0.03
Wheat	0.26	1.69	0.15	0.88
Oil	2.25	1.47	1.53	0.13
Millet	4.06	0.81	5.03	0.00
Bananas	-2.18	1.20	-1.82	0.07
Sugar	-2.93	1.87	-1.56	0.12
Rice	-5.56	1.33	-4.18	0.00
Coffee	1.19	1.29	0.92	0.36
Rubber	0.14	0.68	0.21	0.84
Silver	-2.92	0.98	-2.97	0.00
Copper	-1.39	1.25	-1.11	0.27
Maize	10.08	0.97	10.38	0.00
Settler Mortality	-1.30	0.58	-2.23	0.03
Log per capita income 1990	1.22	1.71	0.72	0.47
Observations: 53				
Dependent variable: Institutional quality 1998				
Constant	0.62	0.29	2.15	0.03
Middle Quintiles	0.02	0.01	4.37	0.00
Ethnic Frac.	0.00	0.00	-3.19	0.00
Settler Mortality	-0.35	0.03	-13.86	0.00
Distance from equator	0.16	0.26	0.61	0.54
Observations: 53				
Dependent variable: Fraction of years open according to Sachs-Warner 1960-94				
Constant	-0.57	0.29	-1.97	0.05
Frankel-Romer Openness Propensity	0.06	0.03	2.28	0.02
Middle Quintiles	0.02	0.01	2.81	0.01
Ethnic Frac.	0.00	0.00	-2.90	0.00
Observations: 53				

Table 6 (continued)				
Dependent variable: Log years of schooling of labor force (average 1960-90)				
Constant	-1.26	0.42	-3.01	0.00
Middle Quintiles	0.06	0.01	6.94	0.00
Ethnic Frac.	-0.01	0.00	-6.59	0.00
Observations: 45				
Dependent variable: Log of GDP per capita in 1990				
Constant	7.21	0.10	69.45	0.00
Institutions	0.61	0.09	6.60	0.00
Sachs-Warner Years Open	0.28	0.17	1.68	0.09
Log Schooling	0.70	0.10	7.03	0.00
Observations: 56				

The evidence suggests that the positive association between middle class share and economic development highlighted at the beginning of this section is due to a causal effect of the former on the latter.

A final robustness check is to apply the hypothesis to a completely different dataset – the different levels of regional development in the United States. Using data on 1,400 US counties with at least 25,000 population (from Alesina, Baqir, and Easterly 1999), I find a strong negative relationship between the ratio of mean to median income (a measure of income inequality) and per capita income. Behind this relationship are examples like the counties in the mountains of Eastern Kentucky, one of the poorest and most unequal regions in the US, in a region long infamous for its entrenched elite (made rich by coal and lumber), local government corruption, and mass of poor and poorly educated whites. I don't have instruments at the county level to establish the direction of causality, but the relationship is supportive of the message of this paper.

### *III. Conclusions*

This paper suggests that the conflicting results in the literature on inequality and growth are missing the big picture on inequality and long-run economic development. Consistent with the provocative hypothesis of Engerman and Sokoloff 1997 and Sokoloff and Engerman 2000, this paper confirms with cross-country data that commodity endowments predict the middle class share of income and the middle class share predicts development and growth. This paper

confirms earlier literature on the mechanisms – institutions, openness, and schooling – by which a higher middle class share raises income and growth. It tests the inequality hypothesis for institutional quality, openness, schooling, and other fundamental determinants of development against other recent hypotheses in the literature. While also finding evidence consistent with other development fundamentals, the paper finds high inequality to be a large and statistically significant hindrance to developing the mechanisms by which economic development is achieved. These results are robust to a number of checks such as testing the overidentifying restrictions, varying the sample size, substituting exogenous “suitability” calculations for crop dummies, and controlling for reverse causality from per capita income to middle class share. The failure to reject the overidentifying restrictions in the system suggest that the tropics effect and natural resource curse effect on underdevelopment work through inequality. The failure to find a significant effect of reverse causality from income to middle class share suggests that the inequality-development relationship much studied in the literature has the causality running from inequality to development.

Of course, these insights could be further deepened and extended by historical analysis comparable to what ES did for North and South America for other regions of the world like Africa, the Middle East, and South and East Asia. Further research could also be done on case studies of different types of commodities in particular countries to examine in more detail the mechanisms by which some commodities led to high inequality while others fostered the development of a large middle class. Clearly, the study of inequality and its effects on economic development will continue to prove a rich field of study.

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