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Two Africas? Why Africa's 'Growth Miracle' has barely reduced poverty

by

Rumman Khan, Oliver Morrissey and Paul Mosley

Abstract

Growth improved substantially in most countries in sub-Saharan Africa (SSA) since 1990, but poverty in SSA as a whole has fallen by about a third, compared to by half or more in other developing regions. While some countries have had little or no success in reducing poverty, many have had significant achievements. The paper argues that inter-country differences, traceable to colonial experience, are crucial to understanding this varied SSA performance. This is based on a distinction between relatively labour-intensive 'smallholder' colonial economies and capital-intensive 'extractive economies' exporting minerals and plantation crops. Because of the more equitable income distribution and African political inclusion generated in smallholder economies, at independence they were in a better position than extractive economies to translate growth into poverty reduction. Since the 1990s (when poverty data are available) the distinction in terms of poverty reduction can be observed. The empirical analysis estimates the growth elasticity of poverty using various specifications, some including inequality. There are two key robust findings: i) smallholder economies significantly outperform extractive economies in poverty reduction; and ii) growth rates do not differ on average between the two groups, but the growth elasticity of poverty is higher in smallholder economies.

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Outline

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This paper is a completely revised version of Rumman Khan, Oliver Morrissey and Paul Mosley (2016), Colonial Legacy and Poverty Reduction in Sub-Saharan Africa, *CREDIT Research Paper 16/01*.

Although *CRP 16/01* found similar evidence for 'two Africas' in terms of poverty reduction -- peasant export economies were more effective at reducing poverty than mine/plantation economies and this dichotomy reflected colonial experience -- there are a number of major differences:

- The way in which countries were classified into one of the two types, although based on colonial records and historical accounts, was not as thorough or rigorous as the method applied in this paper (see Appendix A). This paper also tests a slightly different classification based on cluster analysis and shows that results are qualitatively unchanged (see Appendix C).

- The sample, based on Povcal data for 1985-2013, comprised 20 crop-based and 16 resource-based countries for which we had any data and 33 countries (20 crop-based) for which there were at least two poverty observations. This paper extends the sample to 2015 and comprises 35 countries with at least two poverty observations, 21 Smallholder (adding Liberia) and 14 Extractive (adding DR Congo).

- The analysis used the $1.25 a day poverty line with a maximum of 33 countries (and in some specifications only 31). Here we use $1.90 a day poverty and a larger sample of 35 countries.

- The earlier paper estimated specifications for determinants of changes in poverty, whereas this paper estimates a more rigorous growth elasticity of poverty specification.

Two Africas? Why Africa's 'Growth Miracle' has barely reduced poverty

1. The Issue

Between 1990 and 2012, for most of the developing world, poverty has halved or more than halved except in sub-Saharan Africa (SSA). The simple poverty headcount fell from about 60% to 15% in East Asia; 50% to 25% in South Asia; 20% to 10% in Latin America; but only from 57% to under 43% in SSA (Beegle, Christiaensen, Dabalen and Gaddis, 2016: 21-22). This is despite more than a decade of impressive growth in SSA, averaging 5-6 per cent per year since the late 1990s (Devarajan, 2013: S9). Some countries did (almost) halve poverty, such as Ghana (McKay and Osei-Assibey, 2017) and Uganda (Kakande, 2010), and many achieved significant reductions. In contrast, populous countries such as South Africa and Nigeria, on the available evidence, have not achieved significant poverty reduction.[1] This paper argues that in terms of poverty dynamics there are two separate Africas, in one of which growth is inclusive and broad-based, hence reducing poverty, whereas in the other it is not, and that colonial experience is a major factor determining in which of the two Africas a particular country is located.

To explain variation within SSA in poverty reduction, we consider aspects of colonial experience associated with the emergence of differing potential for redistributive policies to emerge after independence. Following the approach of Myint (1976) and others, we classify SSA countries into two groups according to the economic strategies used by the colonial authorities, using pre-independence data on factors such as inequality, land ownership by Europeans and political participation by Africans (the process is detailed in Appendix A, with validation by cluster analysis). In *smallholder production* economies, African agricultural smallholders had economic and some political participation. In contrast, *extractive production* economies dominated by foreign-owned mines and large-scale farms fostered the emergence of an elite politics characterised by urban bias and capital-intensive production technologies. During the colonial period African economies became clustered around a bimodal structure, which provided better opportunities to the poor in countries whose production was based on the development of labour-intensive smallholder exports than in countries whose growth strategy was based more on capital-intensive mines and large farms. We then test if the growth elasticity of poverty differs between these two groups of countries, using available (PovcalNet) poverty data since 1985, noting that mean growth rates for the two groups were very similar. The analysis shows that the smallholder group significantly outperformed the extractive group, smallholder experience is a significant predictor of poverty reduction, and inclusion of other potential explanatory variables does not alter the conclusion.

A large literature addresses the effect of colonialism on institutions and development in SSA, especially in the context of lasting impacts of historical experience (see Akyeampong, Bates, Nunn and Robinson (2014) for an overview and citations). Following the seminal contribution of Acemoglu, Johnson and Robinson (2001), much of the literature is focussed on the relationship between institutions and growth (e.g. Bertocchi and Canova, 2002; Nunn, 2007). Acemoglu and Robinson (2012) provide a clear exposition of this literature and the argument that extractive political institutions in Africa, created by experiences of slavery and colonialism, can explain poor economic management and performance so that poverty

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[1] For some African countries, especially Nigeria and South Africa, alternative sources of data and poverty lines giving conflicting evidence on trends (see Supplementary Materials, Appendix B).

is high in Africa. This is a narrative of why Africa is globally poor (poverty is high relative to the rest of the world), largely explained by factors accounting for low growth, whereas the concern here is with differences within Africa.[2] The Extractive label is related to the resource curse concept, although the classification is not reliant on mineral resources (see Appendix A) or applied to effects on growth. Furthermore, the evidence that natural resources per se lead to lower growth is weak and contentious (for a critical review see van der Ploeg and Poelhekke, 2017). Our focus is on the ability to construct pro-poor policies and institutions; relative success in reducing poverty can be independent of growth, and derives from differences in the ability to construct inclusive institutions. Ali, Fjeldstad, Jiang and Shifa (2019) show that colonial experience affected state building, a salient feature of institutions. British colonial rule relied on native administration that favoured certain chiefs and ethnic groups, creating ethnic segregation that weakened the capacity of the central state. French rule, in contrast, was more centralised by design and supported the emergence of a stronger centralised state capacity. Although clearly related (British more likely to be Extractive, French more likely to be Smallholder),[3] our focus is on how colonial experience may have established the potential for inclusive development.

Section 2 outlines the core features of the two types and the mechanisms through which the colonial experience relates to the potential for a more inclusive politics to emerge in smallholder economies to deliver greater success in reducing poverty by comparison with extractive economies. Section 3 presents data showing that much of the initial distinction remains apparent today and helps to explain the divergent poverty dynamics in SSA. Section 4 provides econometric evidence on the growth elasticity of poverty, showing that smallholder economies have been more successful in reducing poverty, given their growth rates, than extractive economies. Section 5 concludes.

2.   Colonial Experience and the Politics of Poverty

By the end of the nineteenth century, European colonial powers had largely settled on one of two strategies to organise the economy in their colonies (Hancock, 1943; Baldwin, 1963; Myint, 1976). The strategy we refer to as the *extractive* model, most common in southern and central Africa, allowed European settlers to appropriate mineral-rich areas, and agricultural land for the production of export crops. This model created weak linkages to the rest of the economy, was relatively capital intensive, and excluded Africans from the process of government. Social and infrastructure investment was in areas of European settlement where most production occurred, so this model was associated with high levels of inequality. The alternative model is *smallholder production,* found in most of western and parts of eastern Africa, based on small-scale agriculture that required less capital, but created linkages between the export sector and the rest of the economy, and provided more opportunities for Africans to develop skills and in some cases to achieve promotion into administration.

The issue is how to decide whether to classify a current African country as smallholder or extractive at the time of independence. We do this in three stages, outlined briefly here

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[2] A large literature employs historical variations within Africa to help explain, usually through identification, regional and intra-country differences in current outcomes (see Michalopoulos and Papaioannou, 2019), but this literature does not address national poverty reduction.

[3] Only two French colonies (CAR and Madagascar) are among the 14 Extractive countries included in the analysis, while nine were British colonies; four of the 21 Smallholder analysed were British, whereas ten were French (see Table 3). However, including colonial power does not alter our results.

(documented in detail in Appendix A). First, we use historical evidence that identifies the colonial strategy for many countries, especially as reported in Hancock (1943), Myint (1976) and Mkindawire (2010). This is complemented with information on land ownership, to identify colonies where Europeans appropriated land (extractive) and those where they were not granted land (smallholder), following Mosley (1983), and information on inequality, including access of Africans to public resources (such as infrastructure and education) and to legislative authorities. Combining these sources, allowing for missing data, 39 SSA countries are classified into 17 extractive and 22 smallholder economies (indicated in Map 1, with the list in Table 3 below).

As judgement is required for some countries, to address concerns that the classification is arbitrary, a second step used cluster analysis based on data not employed for the classification (mineral exports, income inequality and an index of egalitarian democracy).[4] The cluster analysis supports the classification for all but a few countries.[5] The third step is to run a series of regressions of the change in poverty (for available data between 1990 and 2015) on a Smallholder dummy and other variables considered as potential determinants of poverty (reduction). The Smallholder dummy is always significant but few of the other variables are significant, and even when they are Smallholder remains highly significant (Table 5 below and Appendix A4). This approach gives us confidence that the classification of countries as extractive or smallholder is appropriate to capture the potential for redistributive politics after independence.

Two mechanisms provided the link from colonial experience to the potential for poverty reduction. The first was the economic production structure. A large proportion of Africans, especially the rural population, were more likely to be engaged in important economic activities in smallholder economies (even if incomes were low they had some ownership of productive assets, especially land) because these were agriculture based. In contrast, fewer Africans were engaged in extractive production, typically controlled by the elite (often Europeans, who were permitted to own land), and when engaged it was as low-paid labour; most native Africans had little access to either physical or human capital assets.[6] The second mechanism was political: in smallholder economies Africans had more opportunities for political participation (even if only at a community level), whereas in extractive economies natives were more likely to be politically excluded (even if involved in native administration, as argued by Ali *et al*, 2019). These mechanisms acted together to the extent that economic engagement reinforced political recognition in smallholder economies, whereas economic alienation weakened political participation (and may have encouraged political conflict or dissent) in extractive economies.

The essence of the classification relies on the degree of economic and political engagement permitted for local Africans. In the smallholder economies, almost all land, and hence export production, was in the hands of Africans; social and physical infrastructure (including schools, hospitals and railways) from the 1920s onward was directed more towards areas of African settlement; and there was greater participation by Africans in

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[4] Mineral exports as a percentage of GDP averaged over 1980-2013; the first observed Gini in our sample (typically for the 1980s or early 1990s); and the Egalitarian Democracy Index in 1960 from the Varieties of Democracy (V-Dem) database (www.v-dem.net/en/data/data-version-7-1).

[5] There are four mismatches: Liberia, Zimbabwe (both omitted from our poverty analysis due to lack of data), Madagascar, and Mauritania (see Appendix A3). Estimating with the cluster grouping does not alter the main results (Supplementary Materials, Appendix C).

[6] Baldwin (1963) provides labour-intensities (number of people employed per $1000 of output) of between 2 and 6 in peasant-export economies, and between 0.03 and 0.31 in other developing countries.

legislative authorities. The situation on these criteria was very different in extractive economies. Consequently, there was already by the end of the colonial period in the late 1950s a significant difference in welfare levels between the two groups of colonies. Table 1 shows significantly higher shares of health and education spending, and lower infant mortality, in smallholder economies on average by the 1950s. Labour-intensity was also much higher than in extractive countries. By the end of the colonial period, income distribution was much more equitable: the richest 20% of the population had less than half of income, compared to an almost two-thirds share in extractive economies (Table 1). These differences, in access of resources for Africans between extractive and smallholder economies, reflect differences in public policies and the allocation of public resources during the preceding colonial period.

Table 1. African countries: policy and welfare indicators, 1920-1960

	Mean, Extractive	Mean, Smallholder	Difference
Labour-intensity per £'000 of output (1955 or nearest year)	0.66	3.08	2.96***
Miles of railway per million population (1955 or nearest year)	76	103	0.30
Health and education spending share in total public expenditure:			
1955 or nearest year	10.3	25.2	3.47***
average 1920-1955	7.1	16.0	2.35***
Under-1 mortality: 1960 (or nearest)	204	137	1.63*
% change (1920-60)	74.1	42.9	2.89***
Income inequality	64.0	46.2	1.84*

Notes: Income inequality measured as the share of income of top 20% of population. 'Difference' is the t-stat for difference between sample means; ***/**/* denotes significance at the 1%/5%/10% level. *Extractive economies* are: South Africa, Zimbabwe, Zambia, Kenya, Nigeria, Mozambique, DR Congo, Swaziland, Angola, Botswana, Lesotho, Republic of Congo, Gabon, and Malawi. *Smallholder economies* are: Uganda, Ghana, Tanzania, Mali, Gambia, Rwanda, Ethiopia, Cameroon, Sierra Leone, Senegal, Burkina Faso, Niger, and Guinea.

Sources: See Supplementary Materials, Appendix A, Tables A1 and A3.

Within each colonial economy, the motivation in choosing a particular strategy was to ensure that the European colonial power benefited from exports (the principal means to transfer resources to the power) but that the colony bore most of the administrative and investment costs. The model imposed on a colony created economic and political structures and institutions with lasting effects. Smallholder economies inherited a legacy with a relatively equitable (for the time) distribution of income and assets where Africans were engaged in (agricultural) export production and political participation (again, relatively for the time). This provided several African countries with a valuable platform at independence for an inclusive development strategy. Our core proposition is that because of this relatively egalitarian initial condition, such countries had greater potential to deliver poverty reduction

as they developed. This did not make such countries any more likely to achieve growth; indeed, for the standard reasons in the literature, most had a weak growth performance until the 1990s and, consequently, poverty remained high throughout the continent.[7] In contrast, extractive economies inherited an enclave economic structure with weak linkages to the rest of the economy, and political exclusion of Africans. This fostered a more exclusive pattern of growth and created incentives for rent seeking and elitist politics unfavourable to delivering poverty reduction (a major exception is Botswana). The extractive legacy is similar to the notion of a Resource Curse but not identical as the latter is primarily about effects on institutions and growth whereas the concern here is with poverty reduction. Furthermore, a certain level of mineral resources is neither a necessary nor a sufficient condition to be classified as Extractive.

Table 2: Political Equality, Extractive vs Smallholder in 1960

Democracy Measure	Extractive (N=17)		Smallholder (N=22)		P-Value
	Mean	SD	Mean	SD	
Egalitarian Democracy Index	0.071	0.044	0.141	0.080	0.001***
Egalitarian Sub-Index:					
Equal Distribution of Resources	0.162	0.132	0.307	0.181	0.006***
Sub-Categories:					
Educational Equality	-1.667	0.921	-0.997	0.942	0.032**
Health Equality	-1.640	0.819	-0.748	1.011	0.004***

Notes: Mean and standard deviation (SD) are unweighted; p-value based on t-stat for difference between sample means, ***/** denote significance at the 1%/5% level.

Sources: Based on data from V-Dem (www.v-dem.net/en/data/data-version-7-1), details in Appendix Table A5.

Potential for political inclusion drives commitment to reduce poverty, this potential was shaped by colonial experience, and visible in characteristics of the country at independence. Table 2 illustrates this, comparing mean values of V-Dem egalitarian democracy indexes for both groups in 1960 (capturing the situation around the time of independence). The Egalitarian Democracy Index is significantly higher (at 1% level) on average in smallholder countries; other democracy indices are also higher for SH but not significantly so, except for Electoral Democracy at 10% level (Appendix Table A5; settler mortality also is not significantly different). Components of the egalitarian index, such as equal distribution of resources, health and education equality, are also significantly higher in Smallholder.

These mechanisms represent underlying tendencies, do not assume that growth is irrelevant to reducing poverty, and do not predict that poverty is lower in Smallholder compared to Extractive economies, but posit that Smallholder are potentially better at translating growth into poverty reduction. Economic growth supports sustained poverty reduction; excepting the immediate post-independence period, most African countries experienced economic (and often political) instability if not stagnation throughout most of the 1970s and 1980s, and this is partly explained by weak institutions as argued by Acemoglu and Robinson (2012). The dichotomy here is a distinction between production structures and the orientation of politics according to how it may deliver inclusive or exclusive

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[7] A number of countries achieved reasonable growth from Independence until the early 1970s, some recovered and grew from the mid-1980s, but relatively widespread sustained growth only emerged in the 1990s.

development. In Smallholder economies, smallholder production of food and cash (export) crops was important and provided a foundation for economic linkages and political institutions that favoured broad-based development. In Extractive, mining and plantation or large-scale export crop production was far more important and institutions emerged to reflect this enclave style of development, with weak economic linkages and political institutions that favoured rent-seeking elites. Map 1 illustrates the distribution of the two types for current African countries.

Map 1: Country Classification
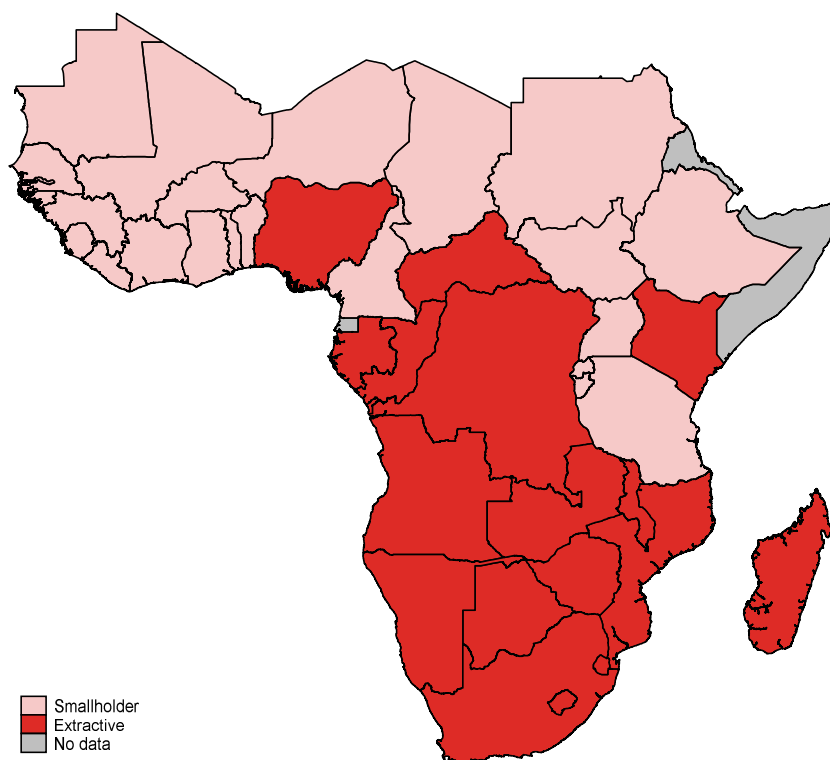
The poverty analysis is for the period 1985 to 2015 (with few observations before 1990), when many African countries did achieve economic growth and when sufficient data on poverty are available, assuming the effects of institutional differences in economic and political inclusiveness persisted from the colonial period. We do not assert that colonialism created these differences; it is possible that local characteristics, such as availability of mineral resources or suitability for different types of agriculture, existed prior to colonialism and influenced the strategy adopted by colonial powers. This possibility would strengthen our argument, in the sense that it is indicative of deep institutional determinants, as the country classification is based on the position around independence.

Colonial heritage is only a broad categorization, and most colonies had elements of both smallholder and extractive production (see Appendix A1). For example, Ghana, Niger and Sierra Leone meet the classification as Smallholder despite containing, since colonial times, a significant enclave dominated by mining companies. In contrast, we classify Nigeria as Extractive given the pre-independence discovery of oil, even though the colonial structure

was smallholder. Another relevant factor is the nature of post-independence leadership, illustrated by countries in East Africa. Inclusive structures were most clearly apparent in Tanzania, where ethnic divisions were not as pronounced (Lonsdale, 2012), whereas post-independence political leaders exploited ethnic divisions in Kenya to capture control of resources. 'The struggle to control state power has led to state-sponsored ethnicity [using] state institutions to create both class interests and ethnic domination by a system of reward and exclusion' (Ogut, 2012: 122).

3 The Statistical Evidence

Although alternative ways of measuring poverty give rise to alternative estimates (see Appendix B and Beegle *et al*, 2016), our analysis uses the World Bank PovcalNet $1.90 a day measure, which covers the most countries for the longest period using standardized poverty lines. In countries that experienced periods of conflict, data are often missing and the period of measurement is crucial. For example, Rwanda has reduced poverty dramatically since 1996, but given the devastating effect of the 1994 genocide, according to the Povcal measure poverty was at the same level in 2011 as it had been in 1986 (the national poverty line suggests a better performance).

Table 3 shows data on growth and $1.90 poverty for 40 SSA countries over 1985 to 2015 (only 35 are in our sample as five only have one poverty observation); the period covered varies by country, as indicated, and the most comprehensive coverage is since 2000. There is considerable variation in growth rates and poverty levels within Extractive and Smallholder, but the simple means (not weighted by population) are instructive. On average, both groups had similar growth rates (just above 4% per annum) but poverty fell by an average annual rate of 1.6% in Extractive compared to 2.9% in Smallholder. Initially (the earliest observation for each country), headcount poverty was slightly higher on average in Smallholder (62.3% compared to 61.7%) but by the most recent observation for each country poverty was on average much lower in Smallholder (39.5% compared to 50.5%). Both groups reduced poverty on average but performance was greater in smallholder economies.

There are 27 countries with data for the whole period (close to 1990, 2000 and 2010), 17 Smallholder (SH) and 10 Extractive (EX). Table 4 (panel A) shows that for these countries, although the difference is not significant, poverty was higher in SH economies in 1990 (by 10.9 percentage points on average weighted by population, 2.4 otherwise). By 2010, poverty was lower in SH economies (by 11.7 percentage points on average weighted by population, 7.8 otherwise), with most of the differential decline occurring in the 2000s. The highest poverty levels were SH in 1990 and 2000 but EX by 2010 (within group variation was initially similar but increased in EX). Panel B shows a broadly similar pattern for the full (unbalanced) sample, although it appears that poverty levels for EX are under-reported in panel A as the restricted sample omits some of the poorest and most populous EX countries. This suggests an explanation for why overall poverty reduction in Africa was modest: although a majority of countries reduced poverty, the most populous (usually EX) countries failed to reduce poverty, significantly or at all. Furthermore, the majority of countries (14/20) that sustained reductions in poverty of at least 2% per annum on average (although in some cases over only a short recent period) are Smallholder. The majority of countries (5/8) that experienced increasing poverty or negligible change are Extractive. Map 2 distinguishes countries with sustained reductions in poverty since 1990 (high performers) from those that have not (low performers) for the $1.90 measure and illustrates the tendency for smallholder economies to perform better, on a poverty-reduction metric, than extractive economies.

Table 3: Poverty and Growth, Extractive and Smallholder Sample Countries

Classification	Period	#	Growth (% pa)	$1.90 Poverty Headcount		
				Initial	Current	% Δ pa
Extractive (14/17):						
Botswana	1985-2009	4	5.8	42.6	18.2	-3.5
CAR	1992-2008	3*	2.5	84.3	66.3	-1.5
Congo, DR	2004-2012	2	6	94.1	77.1	-2.5
Congo, Rep.	2005-2011	2*	4.9	51.6	37.0	-5.4
Kenya	1992-2005	4*	2.8	31.1	42.8	2.5
Lesotho	1986-2010	4*	4.2	74.8	59.7	-0.9
Madagascar	1993-2012	7	2.7	68.9	77.6	0.6
Mozambique	1996-2014	4	7.9	82.7	62.9	-1.5
Malawi	1997-2010	3*	4.3	62.8	71.4	1.0
Namibia	1993-2009	3	4	52.9	22.6	-5.2
Nigeria	1985-2009	5	4.3	53.3	53.5	0.0
Swaziland	1994-2009	3	3.4	81.7	42.0	-4.3
South Africa	1993-2014	7	3.1	29.3	18.9	-2.1
Zambia	1991-2015	9*	4.8	54.1	57.5	0.3
Angola	2008	1		30.1		
Gabon	2005	1		8.0		
Zimbabwe	2011	1		21.4		
Mean			*4.3*	*61.7*	*50.5*	*-1.6*
Smallholder (21/23):						
Benin	2003-2015	3*	4.1	48.9	49.6	0.1
Burkina Faso	1994-2014	5	6.1	83.1	43.7	-3.2
Burundi	1992-2013	4	0.9	81.1	71.7	-0.6
Cameroon	1996-2014	4	4.3	48.1	23.8	-3.8
Chad	2003-2011	2	9.0	62.9	38.4	-6.0
Cote d'Ivoire	1985-2015	10	2.4	6.8	28.2	4.9
Ethiopia	1995-2015	5	8.0	67.1	26.7	-4.5
Gambia, The	1998-2015	4*	3.6	70.5	10.2	-10.8
Ghana	1987-2012	6	5.5	42.6	12.1	-4.9
Guinea	1991-2012	5*	3.8	92.3	35.3	-4.5
Guinea-Bissau	1991-2010	4*	1.4	43.0	67.1	2.4
Liberia	2007-2014	2	6.3	68.6	38.6	-7.9
Mali	1994-2009	4*	5.2	85.1	49.7	-3.5
Mauritania	1987-2014	7	3.8	40.1	6.0	-6.8
Niger	1992-2014	6*	4.3	78.2	44.5	-2.5
Rwanda	1984-2013	5	3.9	60.8	59.5	-0.1
Senegal	1991-2011	5*	3.5	68.4	38.0	-2.9
Sierra Leone	1989-2011	3	2.1	67.7	52.2	-1.2
Tanzania	1991-2011	4*	5.1	72.1	49.1	-1.9
Togo	2006-2015	3	4.1	55.6	49.2	-1.4
Uganda	1989-2012	8	6.9	64.9	35.9	-2.5
Sudan	2009	1		14.9		
South Sudan	2009	1		42.7		
Mean			*4.5*	*62.3*	*39.5*	*-2.9*

Notes: Poverty analysis uses 14 Extractive and 21 Smallholder with at least two surveys. The period is the year span for the surveys used, from initial to current poverty estimate; # is the number of surveys in the country sample (* indicates half or more considered non-comparable in Beegle *et al*, 2016: 32). Growth (annual average percentage change in real GDP) and annual average percentage change in poverty headcount (%Δpa) measured over the relevant period for each country. Means are not weighted by population.

Map 2 $1.90 Poverty Performance, 1990-2015
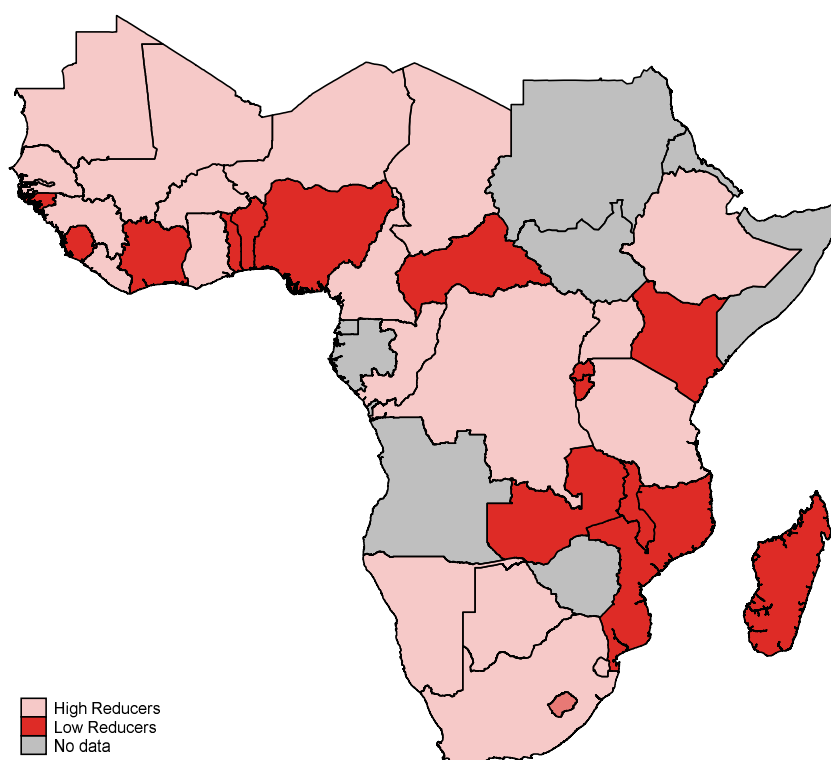
One can now explicitly see the 'two Africas' phenomenon that this paper is highlighting: two groups of countries fall into divergent paths in reducing poverty over up to two decades. Over the 2000s, the high performers (more likely SH) were able to accelerate the pace of poverty reduction and reduce average poverty levels whereas the low performers experienced a further slight increase in poverty. Thus by 2010 high performers not only managed to almost halve average poverty from the levels seen in 1990 but also had almost half the level of poverty of the low performers (more likely EX).

Figure 1 shows the extent of poverty reduction over the period for each country. The 45º line indicates that initial and current poverty are at the same level (in countries above the 45º line, poverty increased) while the lower line represents countries that have reduced poverty by about half since the earliest and most recent survey observation. The top panel (1A) includes all 35 countries with at least two observations. Smallholder economies are more likely to be clustered around the lower line; the main exceptions are countries that were initially small and poor (such as Benin and Togo) and/or experienced significant political instability (Burundi, Cote d'Ivoire, Rwanda and Sierra Leone).

In contrast, extractive economies tend to be around the 45º line; the exceptions are in Southern Africa (Botswana, Namibia, South Africa and Swaziland) and had relatively good institutions. The distinction is clearer in the lower panel (1B) for the 24 larger countries with multiple observations. Only four SH countries are above or near the 45º line, whereas most EX countries are (only South Africa almost reduced poverty by half). Obviously, there is a wide dispersion around both lines and it would be misleading to claim a high correlation

from this simple unconditional relationship between initial and recent poverty; the analysis in the next section shows that the differences are significant (and remain when conditioning on other factors such as growth).

Table 4: $1.90 Poverty in Smallholder Production vs Extractive countries

Panel A	Smallholder			Extractive		
27 countries	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Mean	64.7	52.1	38.2	53.6	54.0	49.6
	(64.4)	(53.4)	(40.7)	(62.0)	(53.0)	(48.5)
Std. Dev.	16.8	21.2	13.7	15.4	13.0	17.8
	(19.4)	(21.1)	(19.1)	(19.2)	(16.2)	(22.3)
Min	16.5	19.6	9.2	29.3	30.9	16.5
Max	92.3	86.0	74.3	84.3	76.8	78.5
N	17	17	17	10	10	10
Pop	189.4	252.5	335.7	173.9	222.8	281.3
% SSA	37.0	37.6	38.3	34.0	33.2	32.0

Panel B	Smallholder			Extractive		
Full sample	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Mean	64.7*	52.6	36.8**	50.9*	58.6	52.4**
Std. Dev.	16.8	20.4	14.2	16.2	19.4	20.2
Min	16.5	19.6	9.2	29.3	30.9	8.0
Max	92.3	86.0	74.3	84.3	94.1	78.5
N	17	21	23	11	14	16
Pop	189.4	275.5	411.7	197.3	315.9	404.4
% SSA	37.0	41.1	46.9	38.5	47.1	46.1

Notes: As for Table 3. Panel A is for the 27 countries with data within 5 years either side of 1990, 2000 and 2010; population weighted values listed first with unweighted poverty in parentheses. Panel B is for any country with data for the year, population weighted. Significant differences in means between smallholder and extractive economies for the relevant time periods indicted by *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Figure 1: $1.90 Poverty Performance (1990-2015 or most recent observation)
1A: All 35 countries and all data
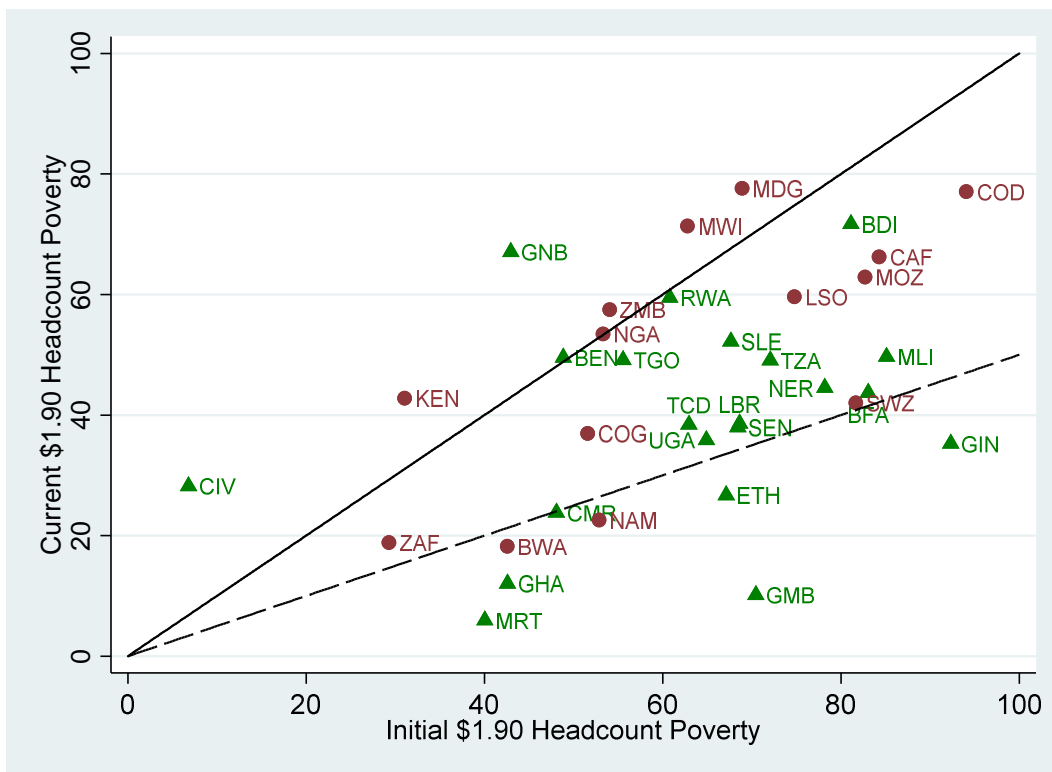
1B: 24 Countries with >10 years data and >3m population in 2010
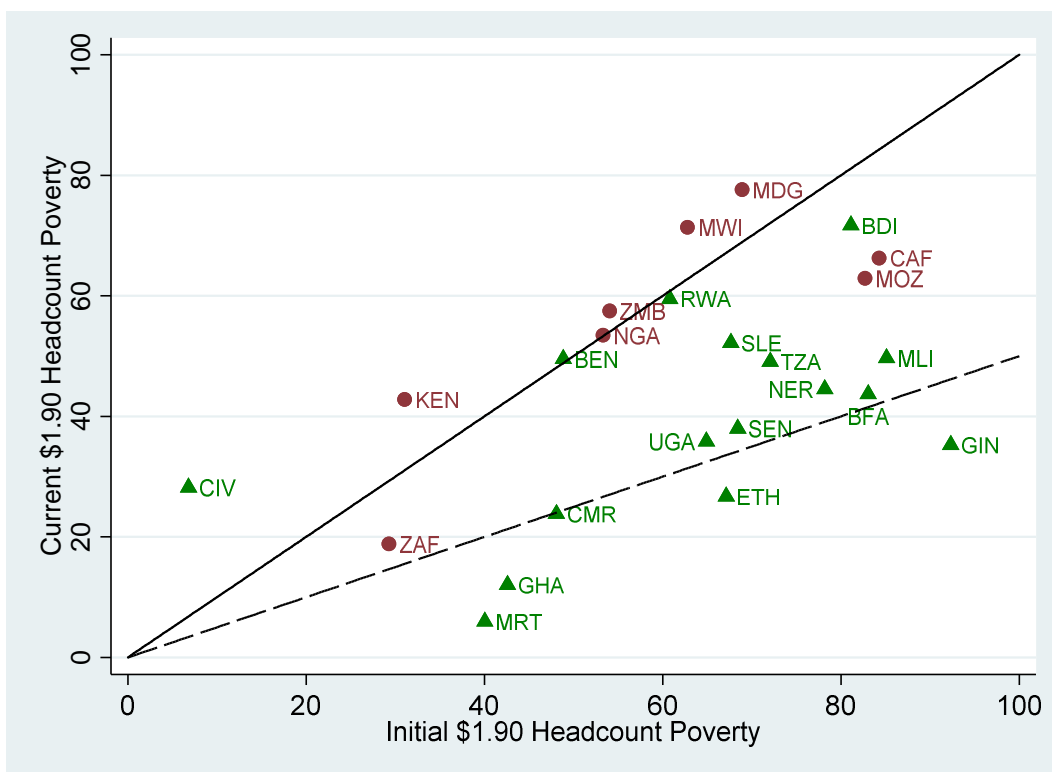
4   Empirical Analysis of Poverty Elasticities

Acknowledging the limited quality of the data with only a few poverty observations for each country, we adopt a parsimonious approach to econometric analysis: the aim is not to explain variation in poverty or poverty reduction *per se*, but to test whether smallholder economies significantly out-perform extractive economies. One particular problem with poverty analysis is that the poorest people produce only for subsistence and have limited contact with the market economy, whereas it is in relation to the subsistence economy that the estimates of national statistical agencies tend to be most inaccurate. This is why many researchers favour the use of household surveys (which do capture subsistence producers and those engaged in the informal sector) over national accounts-based estimates. Unfortunately, nationally representative household consumption surveys are conducted at best every four or five years and often much less frequently, so even if the sample includes many countries the number of observations (surveys) per country is often quite low.

We first conduct a simple test of whether SH have significantly reduced poverty more than EX countries by regressing the total change in poverty over the period for each country on a dummy for SH. We control for countries being observed for differing lengths of time by including dummies for 5-year observation lengths. The results, in the first column of Table 5, indicate that SH countries experienced falls in the headcount poverty rate of 25 percentage points more than EX countries over the whole period. In column 2, we find the above results hold even when controlling for growth in GDP per capita, albeit the effect is slightly smaller at 22 percentage points, highlighting that the SH effect is not from those countries having higher growth rates. The remaining columns in Table 5 introduce other controls to support our claim that it is the colonial experience (which group) driving these results, rather than other factors that may be correlated with the SH classification. The third and fourth columns show that the SH dummy remains largely unaffected when geographic controls are added, highlighting that although the SH classification does have a spatial pattern (most SH countries are in West or East Africa), a country's geographic location is not sufficient for explaining the differing rates of poverty reduction between the two sets of countries. Column 5 shows similar results when controlling for the nationality of the colonist (compared to France, none are significant), suggesting that in contrast to Ali *et al* (2019) it is the form of colonialism rather than identity of the colonist that laid potential for inclusive growth. Although the use of native administration in British colonies may have undermined central state capacity compared to French colonies, the effect did not offset the potential of the smallholder form for poverty reduction. Settler mortality to proxy quality of colonial institutions, following Acemoglu *et al* (2001), is significant and positive (column 6),[8] suggesting association with an extractive strategy although the effect of SH is unaltered. Section A4 of the Appendix conducts further robustness checks showing that the SH dummy remains negative and significant even when accounting for equity, current natural resource utilisation, and a range of political and institutional factors.

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[8] Estimating with the slightly different classification from the cluster analysis yields largely similar results (the coefficient on SH is smaller) but settler mortality is insignificant (see Supplementary Materials, Table C1).

Table 5: Smallholder Classification and Changes in Poverty

	(1)	(2)	(3)	(4)	(5)	(6)
	Δp190	*Δp190*	*Δp190*	*Δp190*	*Δp190*	*Δp190*
SH	-24.625***	-21.729***	-25.502***	-28.038***	-24.597***	-26.142***
	(4.374)	(4.052)	(4.650)	(4.882)	(4.854)	(4.891)
GDPpc growth		-0.117***				
		(0.041)				
latitude			-1.930**			
			(0.775)			
longitude			-0.565*			
			(0.301)			
*latitude*longitude*			0.054*			
			(0.027)			
Southern Africa				-0.999		
				(9.968)		
Western Africa				7.621		
				(9.146)		
Eastern Africa				8.351		
				(9.289)		
British colony					8.551	
					(5.760)	
Portuguese colony					-7.492	
					(11.560)	
Belgian colony					-7.528	
					(8.636)	
Settler Mortality						2.615*
						(1.459)
N	35	35	35	35	35	28
R^2	0.682	0.753	0.752	0.712	0.732	0.738

Notes: Dependent variable is change in $1.90 a day poverty headcount (*Δp190*) since initial observation; *SH* is the smallholder dummy; *GDPpc growth* is the total GDP per capita growth over the whole period covered. All regressions are population-weighted and include 5-year dummies capturing the time elapsed between initial and most recent poverty observation. Column (4) contains region dummies with central Africa being the omitted region; (5) includes colony dummies with respect to French colonies, Ethiopia, Liberia and Namibia. Standard errors in parentheses, and significance levels are indicated using *** p<0.01, ** p<0.05, * p<0.1.

Empirical studies of poverty reduction based on cross-country observations for an absolute measure of poverty, such as the $1.90-a-day headcount, generally focus on estimating the response of poverty to income growth (the growth elasticity of poverty). Most use some extension of the model proposed by Ravallion and Chen (1997) where headcount poverty, *P*, for country *i* in time *t* is given by:

$$\log P_{it} = \alpha_i + \beta \log \mu_{it} + \gamma_t + \varepsilon_{it} \tag{1}$$

In equation (1): β is the growth elasticity of poverty with respect to mean income (or consumption), represented by μ_{it}; α_i are country fixed effects to account for time invariant differences between countries, such as in their distributions or from errors in measurement in the survey data; γ captures the trend rate of change over time *t*; and ε_{it} is a white-noise

error term (which includes errors in the poverty measure). Taking first differences to eliminate country fixed effects gives:

$$\Delta \log P_{it} = \gamma + \beta \Delta \log \mu_{it} - \beta \Delta \upsilon_{it} + \Delta \varepsilon_{it} \tag{2}$$

The rate of poverty reduction is thus a function of the growth in mean income (or consumption) and the error term contains a new process reflecting its correlation within countries and over time. Bourguignon (2003) refers to this as the 'naïve model' as it assumes there is a constant elasticity between poverty reduction and income growth independent of factors such as income distribution. Ravallion and Chen (1997) justify this specification where the aim is to obtain estimates for the 'empirical' elasticity, which shows whether actual growth processes have reduced poverty, rather than an analytically derived elasticity that controls for other factors. Adams (2004) extends this framework by including changes in log Gini into the model in (2) in order to control for changes in the income distribution, thus identifying the distribution-neutral income elasticity of poverty. Bourguignon (2003) refers to this as the 'standard model' and also notes that there exists an identity between changes in poverty, average incomes, and income distributions. This identity can distinguish between changes in poverty arising from income growth and from changing income distributions. Assuming income is log-normally distributed, a functional approximation of the identity can be derived, where the income elasticity depends on the initial income distribution and the initial level of development (measured as a ratio of the poverty line to mean income). The 'improved standard model' adds these two variables to the specification used by Adams (2004). The full linear approximation of the identity includes interaction terms between these two variables, the growth rate of mean income, and changes in the income distribution.

$$\Delta \log P_{it} = \gamma + \beta \Delta \log \mu_{it} + \delta \Delta \log Gini_{it} + \eta_1 \log Gini_{it-1} + \eta_2 \log(z/\mu_{it-1}) + \Delta t + u_{it} \tag{3}$$

$$
\begin{aligned}
\Delta \log P_{it} = \gamma &+ [\beta_1 + \beta_2 \log Gini_{it-1} + \beta_3 \log(z/\mu_{it-1})] \Delta \log \mu_{it} \\
&+ [\delta_1 + \delta_2 \log Gini_{it-1} + \delta_3 \log(z/\mu_{it-1})] \Delta \log Gini_{it} \\
&+ \eta_1 \log Gini_{it-1} + \eta_2 \log(z/\mu_{it-1}) + \Delta t + u_{it} \tag{4}
\end{aligned}
$$

Equation (3) builds on the 'naïve' specification of Ravallion and Chen (1997) by first including change in log Gini as suggested by Adams (2004) and then including initial Gini and initial level of development (measured as ratio of the poverty line z to mean income). Similar to Adams (2004) we also include a variable to capture the time elapsed between surveys (Δt) as these differ across countries. Equation (4) contains the fully specified linear approximation of the identity derived by Bourguignon (2003). This model drops the assumption of constant income and inequality elasticities of poverty and allows them to depend on the initial income distribution, captured by the initial Gini and initial level of development. Similar to Kalwij and Verschoor (2007), we use the specification implied by the functional approximation based on the log-normality assumption rather than imposing the functional form itself (so elasticities are not pre-determined by the functional form). This is appropriate as Breeson (2009) shows that distributions other than the log-normal may be better suited for modelling income distribution and estimating income and inequality elasticities (the log-normal distribution estimates larger elasticities in absolute terms than the

other 13 distributions considered, as well as over-estimating growth elasticity relative to inequality elasticity).

Table 5 shows that the greater level of poverty reduction seen in SH economies was not due to higher growth rates (recall Table 3). We now test whether the growth SH economies experienced was more 'pro-poor' by interacting SH with the change in log incomes in order to see if they had a significantly higher (in absolute terms) income elasticity than EX. As we are interested in assessing how being a smallholder has affected overall poverty reduction performance since the 1990s, we estimate using a cross-section of countries looking at overall poverty reduction from the first poverty observation to the most recent. We estimate using OLS, similar to Bourguignon (2003) and Adams (2004), to keep the specification as simple as possible given there are only 35 country observations. Although this limits the number of observations and the types of estimation, it is the most direct test of the hypothesis (alternative approaches to estimation are discussed in robustness checks in Appendix A).

Kalwij and Verschoor (2007) recommend estimating with panel data using GMM to account for potential endogeneity, which may arise for three reasons. Firstly, the error term in (3) and (4) may be correlated with measurement error of income as the income and poverty measures are based on the same survey data. The bias will vary across regions and countries, as μ_{it} can be measured from income or expenditures. As we focus exclusively on SSA, μ_{it} is always measured using expenditures and we also use GDP per capita as an additional check, so this source of endogeneity is not a concern. Secondly, there may be unobserved time-varying characteristics affecting changes in poverty and income causing omitted variable bias. This is less of a concern here, particularly when estimating (4), as the specification is derived using the identity between changes in income, poverty, and distribution. Furthermore, Breeson (2009) has shown that no one distribution consistently outperforms the log-normal or any other distribution. Nonetheless, the log-normal distribution does over-estimate elasticities and overstates the income elasticity relative to the inequality. As our focus is not on obtaining accurate estimates of these elasticities, but to assess whether SH significantly outperformed extractive economies, this issue is less of a concern.

The final potential source of endogeneity mentioned by Kalwij and Verschoor (2007) arises from participation rates among richer groups in surveys being lower than among poorer groups, so poverty is overstated and income understated. This implies understating the effect of being a SH on poverty reduction and attenuates the difference between the two types of economies, because EX were initially richer and more unequal, hence their initial headcount poverty is more likely to be overstated and initial income levels understated. When looking at changes relative to the initial period, reductions in poverty are more likely to be overstated and growth in incomes understated for extractive economies, therefore income elasticities (in absolute terms) are likely to be overstated. This should be less of an issue when GDP per capita is used to measure incomes rather than the consumption measure found in the surveys.[9]

Table 6 reports the results of including an interaction between the SH dummy and the change in log incomes into the framework in (2), (3) and (4). We use average monthly per capita consumption calculated from the underlying survey data to measure μ_{it} (Table 7 shows the results using GDP per capita in PPP instead). The first two columns show the 'naïve' and 'standard' models respectively, the third shows the 'improved standard' model outlined in (3), while the fourth column contains results for the fully specified linear approximation outlined in (4).

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[9] For robustness, we provide GMM estimates using the instruments and a panel data version of the model following Kalwij and Verschoor (2007) in Supplementary Materials, Appendix Table A9.

Table 6: Poverty Elasticity Regressions (Consumption-based income)

	(1)	(2)	(3)	(4)	(5)
	$\Delta lnp190$	$\Delta lnp190$	$\Delta lnp190$	$\Delta lnp190$	$\Delta lnp190$
$\Delta logCons$	-0.459**	-0.463**	-0.647***	-2.959	-4.575
	(0.174)	(0.178)	(0.206)	(2.420)	(3.362)
SH*$\Delta logCons$	-0.755***	-0.746***	-0.740***	-0.487**	
	(0.189)	(0.197)	(0.226)	(0.207)	
$\Delta logGini$		0.071	0.149	3.502	0.884
		(0.296)	(0.395)	(4.227)	(4.634)
SH*$\Delta logGini$					-0.480
					(0.930)
$LogGini_0$			0.102	0.006	0.548
			(0.412)	(0.340)	(0.478)
$Log(z/Cons_0)$			0.280**	0.016	0.136
			(0.111)	(0.111)	(0.120)
$\Delta logCons*LogGini_0$				0.565	0.904
				(0.631)	(0.895)
$\Delta logCons*Log(z/Cons_0)$				0.599***	0.640***
				(0.117)	(0.129)
$\Delta logGini*LogGini_0$				-0.738	0.236
				(1.154)	(1.199)
$\Delta logGini*Log(z/Cons_0)$				-1.295**	-0.895
				(0.576)	(0.619)
SH income elasticity				-1.409***	
				(0.104)	
EX income elasticity				-0.946***	
				(0.172)	
SH inequality elasticity					1.386***
					(0.241)
EX inequality elasticity					2.022**
					(0.962)
Observations	35	35	35	35	35
R-squared	0.843	0.844	0.893	0.966	0.957

Notes: Dependent variable is change in log $1.90 a day poverty headcount since initial observation ($\Delta lnp190$); income measured as mean consumption from household surveys (*Cons)*; *SH* is the smallholder dummy; *z* is the poverty line and *Gini* is inequality. The zero subscript refers to the initial observation of a variable. All regressions are population-weighted and include 5-year dummies capturing the time elapsed between initial and most recent poverty observation. Income elasticities in column 4 are estimated from equation (4) as $\beta_1 + \beta_2 logGini_0 + \beta_3 log(z/Cons_0)$ + the coefficient on the SH interaction term if the country is a smallholder. The mean $Gini_0$ and $z/Cons_0$ for smallholder and extractive economies are used, thus giving the mean elasticity for each set of countries. The inequality elasticities in column 5 are estimated similarly from equation (4) as $\delta_1 + \delta_2 logGini_0 + \delta_3 log(z/Cons_0)$ + the coefficient on the SH interaction term. Standard errors in parentheses and significance levels are indicated using *** p<0.01, ** p<0.05, * p<0.1.

Throughout all four specifications the interaction is negative and significant: SH economies have (in absolute terms) a significantly larger income elasticity of poverty. The 'naïve' model in the first column, which shows the 'empirical' income elasticity that gives the unconditional effect of growth on poverty, indicates that growth does significantly reduce

poverty in both EX and SH countries but at very different rates. In EX countries, each percentage increase in income growth is associated with poverty reduction of less than half a percent; in SH countries, the same growth rate leads to poverty falling by 1.2 percent. This indicates that EX countries require growth rates to be two to three times higher than SH countries for them to experience similar falls in poverty (at least in percentage terms). The 'standard' and 'improved standard' models (columns 2 and 3) give largely similar results, controlling for changes in inequality, initial inequality and initial level of development (captured by the ratio of poverty line to initial mean consumption).

For the fully specified model (in column 4), the SH interaction term remains negative and significant even when allowing the income elasticity to vary with initial income distributions. The overall elasticity for smallholder economies is -1.409 (standard error 0.104) and for extractive economies is -0.946 (0.172).[10] Note the difference between these two elasticities is 0.463 and that is almost identical to the coefficient on the SH interaction term. This highlights that the lower initial inequality in SH countries does increase their income elasticity (in absolute terms) but this is fully cancelled out by the higher initial level of development in EX countries. Lower initial inequality increases the magnitude of the income elasticity as, *ceteris paribus*, mean income growth will lift more of those below the poverty line above it. Higher initial levels of development also increase the income elasticity, as the same percentage growth in mean incomes leads to a greater absolute increase in income levels; *ceteris paribus*, this will lift more of the population above the poverty line. SH countries were both initially more equal but less developed and these two cancel out when considering the effect of initial income distributions on the income elasticity.[11] In summary, the results in Table 6 indicate SH countries experience an additional 0.75% fall in poverty for each 1% of income growth compared to EX counties. Of this, around 0.25 percent can be explained by differing initial income distributions between the two sets of counties, leaving the remaining 0.5 percent of the differential unexplained. Thus, there is some feature(s) of SH economies beyond their income distribution that causes growth to be more poverty reducing by around 50%.

The final column of Table 6 is also based on the fully specified model but contains an SH interaction with the inequality elasticity rather than income. The results show the inequality elasticity is not significantly different between smallholder and extractive economies. The overall estimated inequality elasticity for EX is larger at 2.02 (standard error 0.962) than for SH at 1.386 (0.24) but not significantly so. It is worth noting that for EX the inequality elasticity is larger (in absolute terms) than the income elasticity while this is not the case for SH. This holds even though we use a specification that assumes an underlying log-normal income distribution, which Breeson (2009) shows over-estimates the income elasticity relative to the inequality elasticity (in absolute terms). This indicates that for poverty reduction, extractive economies have more to gain from focusing on redistributive policies than on growth, whereas smallholder economies already have a redistributive bias.

Table 7 provides comparable estimates with GDP per capita instead of survey mean consumption. In the first three columns, where a constant income elasticity is assumed, GDP growth has no significant effect on poverty reduction for EX economies with the elasticity

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[10] The overall income elasticity for the model in (4) is estimated as $\beta_1 + \beta_2 \log Gini_0 + \beta_3 \log(z/Cons_0)$ plus the coefficient on the interaction term if the country is a smallholder. Likewise, the overall inequality elasticity for the model in (4) is estimated as $\delta_1 + \delta_2 \log Gini_0 + \delta_3 \log(z/Cons_0)$ plus the coefficient on the interaction term if the country is a smallholder.

[11] Estimating (4) without the SH interaction term also gives similar income elasticities for SH and EX countries (at -1.30 and -1.26 respectively).

being close to zero. Whereas for SH economies the elasticity estimates are all close to unity, indicating that each percentage of GDP growth translates to a percentage fall in poverty. These results contrast to those using mean consumption where income elasticities were significant and negative for EX economies, even if not as high as those in SH economies. The overall income elasticities for the fully specified model are negative and significant for both sets of countries, although significance is weaker for EX countries. The elasticities are both close to unity and not significantly different to each other, however this reflects the much higher initial level of development in EX countries particularly in PPP GDP per capita terms. If initial income distributions were equal, the elasticity for SH countries would have been larger by an additional 1.3 in absolute terms rather than 0.3 as the overall elasticities imply. This is also larger than when elasticities were calculated using consumption growth, where the SH interaction term implied elasticities were larger by 0.5, further illustrating how the relative performance of EX countries worsens when income growth is measured using GDP per capita.

Table 7: Poverty Elasticity Regressions (GDP per capita)

	(1)	(2)	(3)	(4)	(5)
	$\Delta lnp190$	$\Delta lnp190$	$\Delta lnp190$	$\Delta lnp190$	$\Delta lnp190$
$\Delta logCons$	0.094	0.071	0.119	10.882	1.242
	(0.349)	(0.357)	(0.427)	(7.277)	(8.699)
$SH*\Delta logCons$	-0.986***	-0.957***	-1.037***	-1.307***	
	(0.298)	(0.309)	(0.364)	(0.373)	
$\Delta logGini$		0.208	0.081	-3.734	2.381
		(0.449)	(0.637)	(9.498)	(12.574)
$SH*\Delta logGini$					-1.510
					(1.951)
$LogGini_0$			-0.200	0.466	0.884
			(0.552)	(0.823)	(1.307)
$Log(z/GDPpc_0)$			0.017	-0.244	-0.119
			(0.124)	(0.249)	(0.340)
$\Delta logGDPpc*LogGini_0$				-2.778	-0.581
				(1.895)	(2.340)
$\Delta logGDPpc*Log(z/GDPpc_0)$				1.096**	0.859
				(0.520)	(0.641)
$\Delta logGini*LogGini_0$				0.774	-0.244
				(2.538)	(3.214)
$\Delta logGini*Log(z/GDPpc_0)$				-1.704	-1.876
				(1.106)	(1.380)
SH income elasticity				-1.306***	
				(0.298)	
EX income elasticity				-1.023*	
				(0.585)	
SH inequality elasticity					0.854
					(0.679)
EX inequality elasticity					3.557
					(2.362)
Observations	35	35	35	35	35
R-squared	0.634	0.637	0.641	0.752	0.618

Notes: As for Table 6 except income measured as GDP per capita in PPP terms (*GDPpc*).

One possible reason for this difference is the third source of endogeneity above, caused by survey data over-representing poorer households, particularly in earlier waves. The relatively larger income elasticities using mean consumption for EX countries is consistent with potential upward bias due to the higher likelihood of poverty reduction being over-estimated and consumption growth under-estimated in these countries. Alternatively, it can be interpreted as showing income growth measured by PPP GDP per capita being less 'pro-poor' than growth in mean consumption from survey data. In addition, one should also keep in mind that as SH economies initially had higher levels of poverty, each percentage fall in poverty represents a larger proportion of the population escaping poverty than in EX countries. The results not only imply growth leads to a larger percentage reduction in poverty in SH countries, but the percentage reduction also represents a larger absolute fall in the poverty level as well.

The total inequality elasticity in column (5) is 3.557 (2.362) for EX and 0.854 (0.679) for SH. Neither are significant, nor are they significantly different, highlighting that redistributive policies are more likely than growth inducing policies to reduce poverty in extractive compared to smallholder economies. The Appendix provides sensitivity analysis showing that results hold when looking at changes in poverty using each individual spell, rather than total changes from initial to most recent. The results are not driven by a few populous countries skewing the population-weighted estimates; and the effect of being a smallholder on income elasticities still holds for higher poverty lines (such as $3.20 a day, see Appendix Table A14).

5.   Conclusions

A political commitment by government is essential to reduce poverty, but how can we explain whether support for redistributive (or pro-poor) politics materialises or not? Many idiosyncratic factors will be relevant in particular cases. A government may respond to experience of civil war by realising that policies which favour one regional or ethnic group to the exclusion of others risk re-igniting conflict, and that an inclusive approach to the allocation of government resources is needed to pre-empt that risk. A broker such as a senior official or an aid donor, or both acting together, is a vital influence in establishing political momentum for an agreed set of pro-poor policies. Access to resources to support expenditure is vital, but in itself does not determine if the resources are allocated to reduce poverty. The core argument of this paper is that potential for political inclusion drives commitment to reduce poverty, and this potential was shaped by colonial experience and visible in characteristics of the country at independence.

Colonial experience laid the foundation for a politics predisposed towards inclusive growth (through the economic structure) and a greater willingness to share the benefits of growth with the poor. In smallholder economies, rural African producers were economically more important and had potentially greater political weight both before and after independence (although this was not always realised). Extractive colonial economies, by contrast, fostered a less inclusive politics after independence (subsequent major resource discoveries had a similar effect). This, combined with the tendency of resource sectors to have relatively weaker linkages with the rest of the economy, implied that growth was less likely to translate into poverty reduction in extractive compared to smallholder economies. We do not suggest that growth is necessarily higher in either type of economy; most African countries have institutions that are not favourable to growth, for reasons established in the literature. Mean growth rates do not differ between the two groups of SSA countries identified (smallholder and extractive), and variables found to be significant in the

institutions and growth literature are either insignificant in explaining poverty reduction or do not alter our core findings. We do argue that the manner in which institutions affected growth are different to the mechanisms influencing poverty reduction. The major finding is that smallholder economies have performed significantly better in reducing poverty since around 1990. On average, smallholder economies reduced poverty by almost half in the two decades after 1990, whereas extractive economies, on average, failed to reduce poverty significantly. Few other variables are consistently significant. Smallholder economies have a more egalitarian democracy than extractive economies and a higher growth elasticity of poverty, hence better performance in reducing poverty.

The essence of our story consists of three elements. First, *history* because colonial and post-colonial policies determine economic structure, the extent of linkages from the core sector to the economy (through demand for factors and inputs and supply of inputs to further processing), and the initial distribution of economic opportunities between rich and poor that influenced the prospects for distributional politics. History lies at the root of the distinction between smallholder and extractive economies. Second, *shocks* (and defences against them) affect the historical legacy, by either consolidating government policies and institutional reforms for an inclusive political settlement, or eroding them by weakening institutions. In this context, resource discoveries are perhaps the most important shock. Third, *policies* are fundamental as lasting inclusive political settlements will only happen if governments are motivated to make them happen, in other words if an inclusive political economy can be brought into being so that politics recognises the needs of the poor. Any policy implications must be stated with caution, because the statistics are limited and so many of the factors are local. Inclusive politics does not imply a bias in favour of the poor, so for example inequality may increase while poverty is reduced, but the poor fare better (and poverty becomes lower) than in extractive economies characterised by exclusive politics. Smallholder economies are far more likely to exhibit an inclusive political settlement.

The more inclusive SSA countries, in most but not all cases, in colonial times promoted African smallholder exports, thereby providing a potential vehicle for broad-based development and distributional politics. The paper explores the nature of that set of policy instruments and what might be the secret of forming the inclusive political settlement required to convert policy instruments into a workable development strategy that benefits the poor. Colonial heritage was important in creating the potential for a more effective distributional politics. In order to reduce poverty, governments must take advantage of this potential or, when it is absent, create the opportunities for inclusive political settlement. Maybe the most crucial influence not yet properly examined is the political significance of smallholder agricultural interests. This would be difficult to quantify, but where smallholders are politically strong, poverty reduction performance has been good, and wherever they are weak poverty reduction performance has been at best limited. Trying to convert this intuition into a serious investigation of the mechanisms through which it works (if it does work) represents an important frontier for future research.

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SUPPLEMENTARY MATERIALS (not for publication with text)

Appendix A: Classifying Countries into Extractive or Smallholder Production

The literature on the history of colonialism in (sub-Saharan) Africa highlights differences in the nature of political and economic engagement of colonial administrations, in particular (from our perspective) the extent of productive autonomy allowed to the indigenous population. At one extreme, colonialism was purely extractive and exploitative (the Belgian Congo is the best example), whereas at the other Africans were allowed to engage in small-scale productive activities, especially in agriculture (what is now Tanzania is a good example, both when a German colony and subsequently when under British control). Where a particular colony was located on the extractive-smallholder producer spectrum largely depended on whether colonial settlers retained control over production (mining, plantation and large settler-owned farms) or instead allowed production by Africans (smallholder agriculture) but controlled trade and marketing. This appendix explains how we classified countries as extractive or smallholder producers, with statistical tests for the validity of the classification.

Section A1 describes how the literature on colonial history was reviewed to classify modern SSA countries according to whether they were of the extractive or smallholder producer type around the time of independence, using data on relevant variables at independence (or as close to then as we could find) to support the classification. The categorization yields predictions about characteristics of the economic structure, inequality and political engagement by Africans that differ between the two types at independence and have implications for how policies towards redistribution and poverty reduction will evolve (Section A2 below). Using data on relevant variables at (or close to) independence, but not the same measures as used for the classification, Section A3 presents cluster analysis tests for the statistical validity of the classification and find it is remarkably robust. Section A4 provides additional regression results including many variables form the 'growth and institutions' literature that may affect poverty reduction performance, and shows the significance of the classification variable remains significant. Section A5 presents alternative results, using different samples or measures of poverty, for the tables in the main text. The main findings are quite robust.

A1. Classifying Colonial Experiences

During the late nineteenth century, two alternative economic strategies were employed by colonial administrations (Hancock, 1943; Myint, 1976). The strategy of settler capitalism, allowing European settlers to appropriate land for mining and agricultural land for the production of export crops, applied to South Africa, Zimbabwe and parts of Angola, Mozambique, Democratic Republic of Congo (DRC), Kenya and Zambia. We classify such colonies as *extractive*, in which the colonial power established institutions to exert considerable economic control, with the consequence of relatively high levels of capital-intensity in production, economic inequality and political exclusion of African smallholder producers. The alternative strategy, peasant export development, found for example in Senegal, Ghana, Sierra Leone, Nigeria, Uganda and Tanzania, provided more opportunities for Africans to develop skills and even to achieve promotion into administration (Mosley, 1983). We classify such colonies as *smallholder production*: agricultural production, especially for export crops, was largely in the hands of indigenous African smallholders

(often settlers were prohibited from owning land), although marketing was controlled by the colonial government. In Smallholder, infrastructure was adapted to exports of smallholder crops, a rural sector developed and inequality was relatively lower; and Africans had more opportunities for political engagement.

Smallholder agriculture was important in the latter economies as a process for creating broad-based development, given its relatively strong linkages with the rest of the economy, and generated a politics in which advancement of low-income Africans was easier to achieve. Even by the late 1920s, substantial differences in infant mortality, real wages and other measures of well-being had emerged between extractive and smallholder economies (Bowden and Mosley, 2012: figure 13.2). Smallholder agriculture economy status provided a legacy in the shape of a relatively equitable initial distribution of income and assets that eventually provided several African countries with a platform for an inclusive development strategy. In contrast, mining and plantation economies were based on sectors with relatively weak linkages to the rest of the economy. This fostered a more exclusive pattern of growth and created incentives for rent seeking and elitist politics.

A central concern in governing any colony was how to minimise the net cost imposed on the metropolitan country, and the focus of this inquiry is on the implications of the two contrasting strategies which were employed in Africa to achieve this. Applying the types of Myint (1976) for the whole developing world to Africa only, the extractive-smallholder distinction is based on whether land was appropriated by European settlers, or Europeans were not allowed to own land and agricultural production and exports were in the hands of indigenous African smallholders. The criterion for being an extractive ('settler' in Mosley, 1983) economy is that five per cent or more or the total land area was reserved for Europeans in 1920. As can be seen in Table A1, all those we classify as extractive economies meet this criterion even in 1955 (i.e., less than 95% of land held by Africans, where data are available) with the exception of Nigeria (discussed below), whereas none of the smallholder economies do (Ethiopia is a special case, not a colony but with smallholder characteristics, and Senegal is on the margin). During the early years of the twentieth century, when the colonial power did not always control the entire country, the criterion that five per cent or more of the total land area was reserved for Europeans in 1920 is ambiguous (it was common in some African countries for Europeans to settle land on their own initiative without having any formal title). Nevertheless, by about 1940, Europeans were far more likely to own a large share of land in extractive economies, and no or negligible land in smallholder economies (Table A2). Although not as clear cut in 1955, mineral exports tend to be more important in extractive economies also, and inequality tends to be lower in smallholder economies.

It is clear from Table A1 that, although terminology and sample coverage differs, our classification of countries is very similar to that of Mosley (1983) and Mkandawire (2010); the latter characterises most of the extractive economies as either labour surplus or concession company colonialism, and most of the smallholder as cash crop. This is not surprising as all classifications are based on historical sources, essentially the same sources in the case of Mosley (1983). The sources for Mkandawire (2010), by contrast, are based on Amin (1972), who provided the labour surplus, cash crop and concession companies classification, except that Tanzania and Uganda are reclassified as cash crop following Oliver and Atmore (1976). Although based on common sources, criteria differ according to the specific concern of the study and classifications are therefore not identical, as shown in Table A1(the previous studies did not attempt statistical validation).

Table A1: Classification of Countries into Extractive or Smallholder

Our Classification	Other Classifications		1955 or nearest year		1955 or nearest year	
			African land (%)	Mineral X (%)	Income inequality	
	Mosley	M (2010)			Bottom 40%	Top 20%
Extractive (17):						
Angola*	S	L	88	39.5		
Botswana	S	L	94	6.5		
CAR		CC				
Congo (DRC)	S	CC	91			
Congo (Brazzaville)	S	CC				
Gabon*		CC				
Kenya	S	L	93	4.9	9.9	68.0
Lesotho	S	L				
Madagascar		L				
Malawi	S	L	87	4.5		
Mozambique	S	L				
Namibia		L				
Nigeria	P (1950s)	C	99	23.4		
South Africa	S	L	13		6.2	58.0
Swaziland	S	L	49			
Zambia	S	L	95	88.2	14.5	57.0
Zimbabwe*	S	L	51	34.0	8.2	69.0
Mean			*76*	*31.8*	*9.5*	*64.0*
Smallholder (22):						
Benin		C				
Burkina Faso	P	C	100	1.0		
Burundi		CC				
Cameroon	P	C	97	2.5		
Chad						
Cote d'Ivoire		C				
Ethiopia	P		93	1.5		
Gambia	P	C	100	0		
Ghana	P	C	99	5.6	21.0	47.5
Guinea	P	C	100	2.5		
Guinea-Bissau		C				
Liberia						
Mali	P	C				
Mauritania		C				
Niger	P	C	100	6.5	18.0	42.0
Rwanda	P	CC	100	0		
Senegal	P	C	95	0.5	10.0	64.0
Sierra Leone	P	C	99	7.8		
Sudan*						
Tanzania	P	C	98	4.7	13.0	61.0
Togo		C				
Uganda	P	C	99	2.5	17.1	47.1
Mean			*98*	*4.1*	*15.8*	*46.2*

Notes: Countries in *italics* with * are omitted from the poverty analysis due to data limitations but included in the cluster analysis. Other classifications: Mosley is either settler (S) or peasant export (P), from Mosley (1983) – Nigeria was P until the mid-1950s; M (2010) is Mkandawire (2010), labour surplus (L), cash crop (C) and concession company (CC). All data are for 1955 or nearest year (blank indicates not available). African land is % of cultivable land in African hands; Mineral exports (X) as a share of total exports; inequality is share of income of the bottom 40% or richest 20%.

Sources: Land from Mosley (1983, ch1) and British Online Archive (2006); mineral exports from British Online Archive (2006); inequality data from Chenery *et al* (1975, Table 1.1).

Classifications differ somewhat as studies have a different focus: Mkandawire (2010) was concerned with the effect of colonial heritage on the evolution of institutions that influenced the tax capacity of the state (for financing colonial administrations, including the cost of maintaining law and order), whereas our concern is with the influence on views towards redistribution. Thus, we are concerned with the economic structure (in particular the importance of mineral exports), the extent of land ownership by colonials, and the extent to which Africans can participate in legislative authorities (see below). Concerns that the classification may be arbitrary are addressed in Section A3.

Colonial heritage is only a broad categorization and in many countries there were extractive and smallholder elements, and it was not always clear which would predominate. For example, when Tanganyika (now Tanzania) was in German hands from the late 19th century until World War 1 there was an influential settler community in the North keen to promote a plantation economy in conflict with a Governor who wanted to promote African smallholder production in the centre. The result was a compromise in effect if not intent (Iliffe, 1969), but smallholder production was sufficiently developed so that under British rule Tanganyika became more of a peasant than a settler economy. This was reinforced by the post-independence policies of Julius Nyerere.

The classification of other countries changed over time; Ruanda-Urundi is treated by Mkandawire (2010) as a concession company colony but this is largely because it was on the periphery of the former Belgian Congo; post-independence Rwanda and Burundi developed as smallholder agriculture economies. Post-independence development in some countries was affected by the timing of new discoveries of mineral resources. The discovery of oil in Nigeria was in the 1950s and mineral exports were relatively high before independence (Table A1) so we classify Nigeria as extractive. In other cases resource discoveries distorted the development of smallholder economies and dissipated the initial redistributive potential. Cote d'Ivoire, for example, had an established structure of smallholder production in cocoa, coffee and cotton (the major exports) by the time of independence in 1960 (Abbott, 2009: 393); resource discoveries after independence were associated with rent-seeking, political instability, civil conflict and poor governance. The consequent failed development (especially growth) strategies after independence undermined the potential for reducing poverty.

In contrast, some extractive economies were able to develop effective inclusive poverty reduction strategies; Botswana may be the best example (Poteete, 2009) but Namibia is another. An important reason for why Botswana avoided the extractive institutions that emerged in Rhodesia and South Africa is because chiefs from the Bechuanaland Protectorate (as it then was) were successful in preventing the British South Africa Company taking control of territories, so that British rule was light touch. This allowed the chiefs to preserve an existing system that was similar to inclusive political institutions, centralized and largely pluralistic, and reinforced after independence (Acemoglu and Robinson, 2012: 404-13). These specific circumstances render Botswana an exception to the argument of Ali *et al* (2019) that British colonial rule created ethnic segregation that weakened the capacity of the central state.

There is a link between extractive economies and the notion of a Resource Curse, 'the tendency of resource rich (and mineral rich, in particular) economies to underperform in economic growth and other development outcomes' (Papyrakis, 2017: 175). The resource curse literature is of only tangential relevance for a number of reasons. Most importantly, the literature has largely focussed on growth or income effects, or how competition over resource rents can generate conflict, and the evidence that resource windfalls are associated

with lower growth is weak (van der Ploeg and Poelhekke, 2017). We find no consistent growth difference: on average, our sample of extractive economies had a similar growth performance to smallholder economies. Furthermore, the resource curse literature does not address effects on poverty reduction.[12] A recent survey suggests that There is nothing in the resource curse literature specific to either SSA or colonial heritage, especially regarding how the latter shapes the institutional foundations for the evolution of poverty reduction policies. In fact, the common concern is that resource discoveries change how politics operates, leading to policy deterioration, and in particular if institutions are initially weak then 'resource wealth gradually erodes them' (Collier, 2017: 219). Furthermore, as shown in Table A1, some of the extractive economies have lower mineral export shares than some of the smallholder economies.

Colonial experience as described here is not deterministic. It created initial conditions that either increased the likelihood of inclusive policies emerging that were favourable to poverty reduction (the relative political and economic importance of rural producers in smallholder economies supported broad-based politics) or made exclusive rent-seeking politics more likely in extractive economies where particular groups had preferential access to economic and political influence. Within this context, significant new resource discoveries may have adverse effects depending on the timing and prevailing conditions. This can be illustrated considering Ghana (smallholder, but initially with gold - oil discoveries are very recent) and Nigeria (reclassified).

Ghana and Nigeria both originated as smallholder-based economies in which smallholder exports (of cocoa and palm oil) served as the mainspring of economic growth and provided the buffer of low initial inequality deriving from the wide diffusion of gains from those exports. However, after the discovery of oil in the 1950s, Nigeria became a resource-based economy with long periods of military government and political turbulence, especially the civil war in the mid-1960s. The conventional wisdom is that in Nigeria the political system was not able to resist, and indeed amplified, the effects of the 'natural resource curse'. Nigeria's oil resources generated Dutch disease, promoted a capital-intensive pattern of production which was bad at generating new jobs, and stifled rather than encouraged smallholder agriculture where most of the poor were based (Bach, 2004; World Bank, 2013). Although oil provided the government with significant revenues for investment and spending these were not used to finance public spending on smallholder agriculture, the mainstay of most poor people's subsistence (Mogues *et al*, 2012), or investment in education. The rent seeking induced by resource wealth ensured that growth in Nigeria has not been inclusive.

Post-independence Ghana was, with the exception of a period of authoritarian rule in the 1970s, politically a relatively stable country with a strong smallholder cocoa sector, acting as at least a counter-balance to the gold mining sector. By independence, mineral exports were modest and inequality was relatively low (Table A1), with investment in education accessible to Africans (see below). It was one of the first SSA countries to abandon single-party, quasi-authoritarian politics in favour of genuine multi-party democracy in the 1992 elections, won by the National Defence Council (NDC), the more rural-oriented and less business-oriented party, which initiated political organization of the poor with Jerry Rawlings (the previous coup leader) elected as President. The focus on educational policies was a key instrument to capture the loyalty of poor voters; 'after taking power Rawlings and his … [government] organized, and served, the poor' (Kosack, 2012: 200). Despite this

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[12] One exception is Weber (2012) who finds no effect of shale gas extraction on household poverty in booming counties compared to control counties that do not border those with shale gas (for Colorado, Texas and Wyoming).

political orientation, the decline in headcount poverty in Ghana over the course of the 1980s and 1990s largely benefited workers (including farm workers) and the self-employed, and was more pronounced in urban than rural areas (Nsowah-Nuamah *et al*, 2010). The benefits were least in subsistence farming areas of the north (Porter, 2003; World Bank, 2011; Olinto and Uematsu, 2013). This may disguise the benefits for commercial farmers and cocoa smallholders who were above the poverty line by the mid-1980s. The key elements in the reform process from the 1980s did benefit agriculture: tax reform and tariff reduction; liberalisation of the exchange rate regime; and privatisation of statutory marketing boards resulting in large increases in the on-farm price received by producers. Ghana, since 2009, has of course become an oil exporter; this has given rise to concerns over potential redistributive and political consequences and how to avoid the Nigerian precedent (Collier, 2017; Kopinski *et al*, 2013).

Another relevant factor is the nature of post-independence leadership, illustrated well by countries in East Africa. In East Africa, post-independence politics were instrumental in the way in which redistributive politics evolved. Inclusive structures were most clearly apparent in Tanzania: ethnic divisions were not as pronounced as in other countries, in part because the widespread adoption of Swahili supported unity in nationalist and post-colonial eras (Lonsdale, 2012: 40), and Nyerere successfully promoted an inclusive politics. Ethnic divisions in Kenya were exploited by political leaders to create a divisive form of ethnic patriotism (Lonsdale, 2012). White settler interests were concentrated in the Rift Valley and in the post-independence period Kenyatta supported resettlement of Kikuyu there, forging an (ultimately fragile) alliance with Kalenjin so that the ethnic groups in the leadership captured control of resources (Ogut, 2012).

Political stability in Uganda only lasted until the early 1970s and it was not until 1986 that fourteen years of political turbulence with five years of guerrilla war ended. The victory of Yoweri Museveni and the National Resistance Movement (NRM) permitted a 'new beginning' and initially had priorities for restoration of the rule of law, the economy and infrastructure (returning in a sense to the situation at independence). Three key policy measures were associated with poverty almost halving between 1992 and 2000: agricultural reform, including the removal of taxes on exports (coffee and cotton – the bulk of which were produced by low-income smallholders); the prioritising of pro-poor expenditures including primary health and education, rural infrastructure and smallholder agriculture; and the pursuit of universal primary education (Mosley, 2012).[13] An important element in the allocation of resources in Uganda has been a process of decentralization to local councils and allowing an increasing role for non-governmental organizations (Barr and Fafchamps, 2006), consistent with an approach of political inclusion. Advocates for the poor were incorporated into the machinery of government (through the dominant NRM party) to serve as a buttress against protest, and the whole process was reinforced by the boost to rural smallholder income provided by agricultural liberalization.

A2 Conceptual Framework

The approach adopted here builds on Bowden and Mosley (2012) who argued that in African colonies allowing ownership of land by European settlers, compared to those countries which did not, a pattern of policy (especially fiscal policy) emerged which was bad for reducing poverty and deprivation, although we cover a larger number of SSA countries.

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[13] Mosley (2012) also observes that similar policies were associated with significant reductions in poverty in Ghana.

Three components of the policy regime are particularly important: the sector mix; the level of investment in human capital, especially of the poor; and the rate of taxation imposed on the poor, in particular on exports by primary producers. The contrast with Acemoglu *et al* (2001), who trace a link from colonial to current institutions that helps to explain why Africa is poor (relative to other parts of the world, and due to low growth), is illustrated in Figure A1. Bowden and Mosley (2012) consider how colonialism shaped institutions and policy as it impacted on distribution, and hence on the potential for poverty reduction. This permits addressing why some African countries have been more successful, other things equal, in reducing poverty, the aim of the classification used here.

Figure A1. Alternative causal sequences from Colonialism to Development

(a) Acemoglu et al (2001) [in the context of growth]
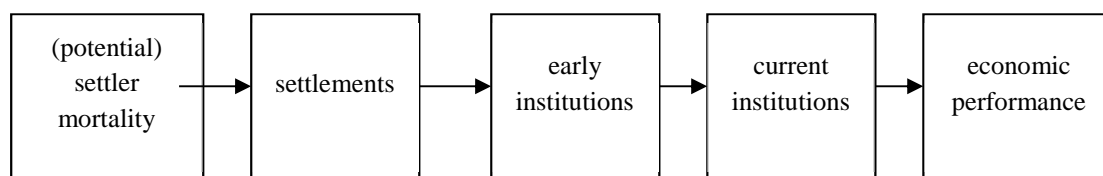
(b) Bowden & Mosley [in the context of poverty reduction]
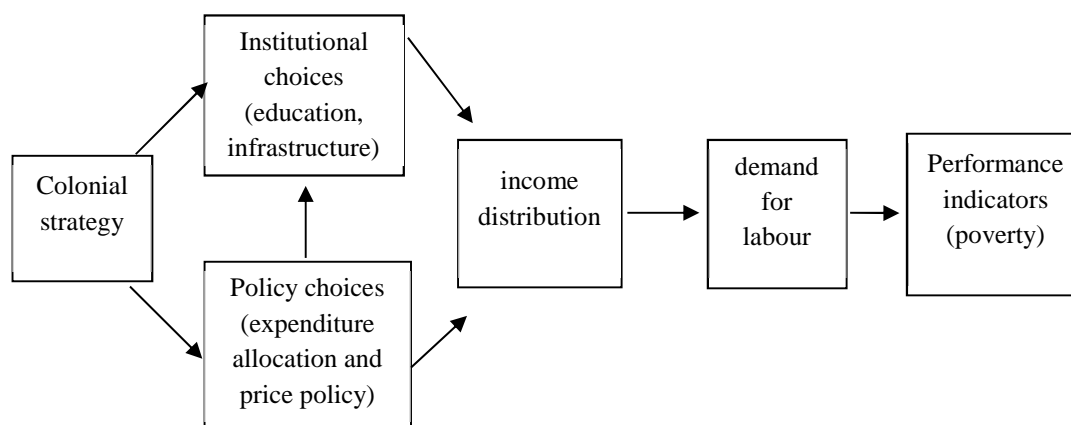
The basic proposition is that smallholder economies generated conditions for inclusive policies, whereas extractive economies did not (in general). Table A2 shows that in the extractive economies, and there only, the control of expatriates over land translated itself into control over the apparatus of government through elected representation. Data on the share of non-Africans in legislative assemblies, local or national, is limited but their representation is clearly greater in Extractive. Note that this differs from the argument of Ali *et al* (2019) regarding local participation in native administration under British colonial rule. Bowden and Mosley (2012) provide evidence that access to public resources was greater for Africans in smallholder than extractive colonies. For example, the extent of the rail network and potential access of low-income Africans was much greater in Ghana and Uganda than in South Africa, Zimbabwe and (to a lesser extent) Kenya by the late 1920s. In terms of

human capital, even by the late 1930s, no university or institution of higher education offering access to black students existed in any part of Kenya, Zimbabwe or South Africa, whereas Ghana and Uganda had access to third level institutions from the 1920s, enabling Africans to access the Civil Service. Ghana had far higher secondary enrolment levels for Africans than Kenya or Zimbabwe as late as the 1950s.

Table A2. Extractive and Smallholder African Colonies, circa 1938

	Extractive			Smallholder	
Modern State	European land (%)	Elective share (%)	Modern State	European land (%)	Elective share (%)
South Africa	87	92	Ghana	0	36
Zimbabwe	49	100	Uganda	0	0
Zambia	3	92	Tanzania	0	0
Kenya	7	72	Nigeria	0	0
Angola	12	76	Mali	0	na
DR Congo	9	80	Burkina Faso	0	na
Swaziland	51	na	Rwanda	1	0
			Mozambique	3	0

Notes: European land share is percent of land alienated or reserved for Europeans. Elective share is elected representation of non-Africans on legislative body. 'na' = not available. Zambia was Northern Rhodesia; DR Congo was Belgian Congo; Burkina Faso was Upper Volta (see below for other colonial names).

Notes on elective shares: South Africa: in Transkei, four African representatives chosen either by election or by chiefs' nomination; in all other states, representation of Africans vested in Governor-General. Zimbabwe (Southern Rhodesia): representation of Africans in legislative assembly by appointment through Minister of Native Affairs, not by election. Ghana: proportion of elected European members fixed by 1928 constitution; after 1958, no elected European members. Uganda: no direct elections to legislative assembly; members nominated by chiefs at county level. Tanzania (Tanganyika): no direct elections; indirect rule through native authorities. Nigeria: direct elections at municipal not federal level; indirect rule through native authorities. Rwanda: no direct elections, chiefs exercising quasi-feudal authority.

Sources: Adapted from Mosley (1983, Table 1.1), extended using data from Hailey (1938).

In the smallholder economies, agricultural production was largely in the hands of indigenous African smallholders (including for export crops) and, as noted above for Ghana and Uganda, access to public resources was more oriented towards areas of African settlement. Table A3 shows significantly higher shares of health and education spending, and lower infant mortality, in smallholder economies on average by the 1950s. Labour-intensity was also much higher than in extractive countries; Baldwin (1963) reported labour intensities of between 2 and 6 (people employed per $1000 of output) in various smallholder economies, compared to between 0.03 and 0.31 in various mining economies in developing countries. A consequence is that, by the end of the colonial period, income distribution was much more

equitable: the richest 20% of the population had less than half of income, compared to an almost two-thirds share in extractive economies (Table A3). Just before the African colonies achieved independence, during the late 1950s and early 1960s, there was already a significant difference in access of resources for Africans between extractive and smallholder economies, which can be ascribed to differences in public policies and the allocation of public resources during the preceding colonial period.

Table A3. African countries: policy and welfare indicators, 1920-1960

	Mean, extractive	Mean, smallholder	Difference
Labour-intensity per £'000 of output (1955 or nearest year)	0.66	3.08	2.96***
Miles of railway per million population (1955 or nearest year)	76	103	0.30
Health and education spending share in total public expenditure:			
1955 or nearest year	10.3	25.2	3.47***
average 1920-1955	7.1	16.0	2.35***
Under-1 mortality: 1960 (or nearest)	204	137	1.63*
% change (1920-60)	74.1	42.9	2.89***
Income inequality	64.0	46.2	1.84*

Notes: Income inequality measured as the share of income of top 20% of population. 'Difference' is the t-stat for difference between sample means; ***/**/* denotes significance at the 1%/5%/10% level. *Extractive economies* are: South Africa, Zimbabwe, Zambia, Kenya, Nigeria, Mozambique, DR Congo, Swaziland, Angola, Botswana, Lesotho, Republic of Congo, Gabon, and Malawi. *Smallholder economies* are: Uganda, Ghana, Tanzania, Mali, Gambia, Rwanda, Ethiopia, Cameroon, Sierra Leone, Senegal, Burkina Faso, Niger, and Guinea.

Sources: Labour intensity from British Online Archive (2006), and statistical abstracts of individual countries; health and education spending from British Online Archive (2006); railways from Griffiths (1984); mortality from Kuczynski (1948) and World Bank (1978); income inequality from Chenery et al (1975, Table 1.1, pp 8-9).

Acemoglu and Robinson (2012) provide a clear argument that history, in particular slavery and colonialism, has shaped the nature of political institutions in sub-Saharan Africa. Specifically, Africa exhibits extractive political institutions associated with elite capture and rent seeking. 'We will refer to political institutions that are sufficiently centralized and pluralistic as inclusive political institutions. When either of these conditions fails, we will refer to the institutions as extractive political institutions' (Acemoglu and Robinson, 2012: 81). They note (p178) that slavery of various forms, including serfdom (such as *gult* in Ethiopia), has a very long history throughout Africa. This notion of extractive is broader than our classification, and many smallholder economies have extractive political institutions in their sense, manifested in the manner in which inefficient agriculture marketing boards (often established during colonial times) did not serve the interests of farmers (who were taxed heavily while the low prices paid discouraged investment). 'The reason that the policies of the marketing boards were so unfavourable to rural interests was that these interests had no political power' (Acemoglu and Robinson, 2012: 339). This

applied in some, but not all, smallholder economies at least until the late 1980s. We are not claiming that farmers had political power in smallholder economies, but do claim that they had relatively more influence or political recognition than in extractive economies. In some countries this was evident in the early years after independence (e.g. agriculture performed reasonably well in Tanzania for much of the 1960s; Morrissey and Leyaro, 2009: 311-2). When economic reforms were implemented from the mid-1980s, there was greater potential to benefit farmers and rural areas in smallholder economies, and this is one reason why they may have achieved greater poverty reduction than extractive economies.

A3. Cluster Analysis

As classifying countries according to historical assessments and selected data may be considered arbitrary, the robustness of grouping into extractive and smallholder economies can be assessed by testing if countries are clustered based on the main characteristics identified to differentiate the two groups. Two variables of specific interest in the classification above are mineral exports (to capture the extractive base) and inequality; relevant data are not available for all countries at the time of independence so we use the earliest relevant indicator available for all countries. For Gini we use the first observation available in the data, which typically is for the early 1980s or 1990s (see date of first survey reported in Table 3 of main text). Data on mineral exports as a percentage of GDP is more fragmented and inconsistent, thus we use the average of all observations reported between 1980-2013. Given primary interest in political orientation towards redistributive and poverty reduction policies, we avail of measures of equality of access to resources and the redistributive stance of politics for the two groups of countries in 1960, using data from the Varieties of Democracy (V-Dem) database (Coppedge *et al*, 2017). For the initial cluster analysis we use an appropriate overall measure, the Egalitarian Democracy Index, but also report below (Table A5) the differences in means for other V-Dem indicators.

Using K-means we cluster countries by minimising the Euclidean distance between three key variables: mineral exports, Gini, and the Egalitarian Democracy Index. The standardised z-scores of the variables are used to avoid large scaling effects on the measure of distance. As a dichotomous categorisation may not be the most appropriate, we follow Makles (2012) in calculating the within sum of squares (WSS) and the η^2 coefficient for different numbers of clusters to identify which is most suitable. The WSS can be used to get a scree plot to search for a kink, while η^2 is quite similar to the R^2 at measuring the goodness of fit. Figure A2 plots both measures for up to 10 clusters and finds a kink exists at four. Table A4 reports the K-means clusters of four groups based on the z-scores of the three variables.

Of the 37 countries for which we have data (all countries reported in Table A1 excluding Congo DR and Chad), K-means clusters into four groups (Table A4). Groups 1 and 2 (with 6 and 10 countries) correspond to extractive economies, and Groups 3 and 4 (with 16 and 5 countries) to smallholder economies. With these two groups for each class the total numbers in each classification are almost the same as Table A1 (21 smallholder, 15 extractive), although the composition is not identical. Four of the 37 countries are in different categories: Liberia and Mauritania we classify as smallholder but are clustered in Group 1; Madagascar and Zimbabwe we classify as extractive but are clustered in Group 3. Clustering into two categories yields similar results with a 24-13 smallholder-extractive split with three mismatches: Madagascar, Nigeria and Zimbabwe, which appear in the smallholder cluster whereas we classify them as extractive economies. However, the results for two clusters are very sensitive to the initial seed used to generate randomly the initial group centres. The results with four clusters are more robust, as indicated by the high η^2 value.

Given the inherent difficulty in any attempt to quantify colonial legacy, with incomplete data for many countries at the time of Independence and the likelihood that some countries will have values at the margin for at least some indicators (especially as mineral export shares may be sensitive to when they are measured), the results are encouraging. Only a few countries may be misclassified, they are relatively small (at least in population), and are unlikely to affect the qualitative results of our analysis (see Appendix C for confirmation). We offer further evidence to support the validity of our classification by comparing the means of extractive against smallholder countries for indicators of political egalitarianism at independence and settler mortality as an indicator of the nature of colonialism (Table A5). In Section A4 we show that the extractive-smallholder variable remains significant when alternative indicators are included in a baseline regression.

Figure A2. Plots of Number of Clusters against WSS and η^2
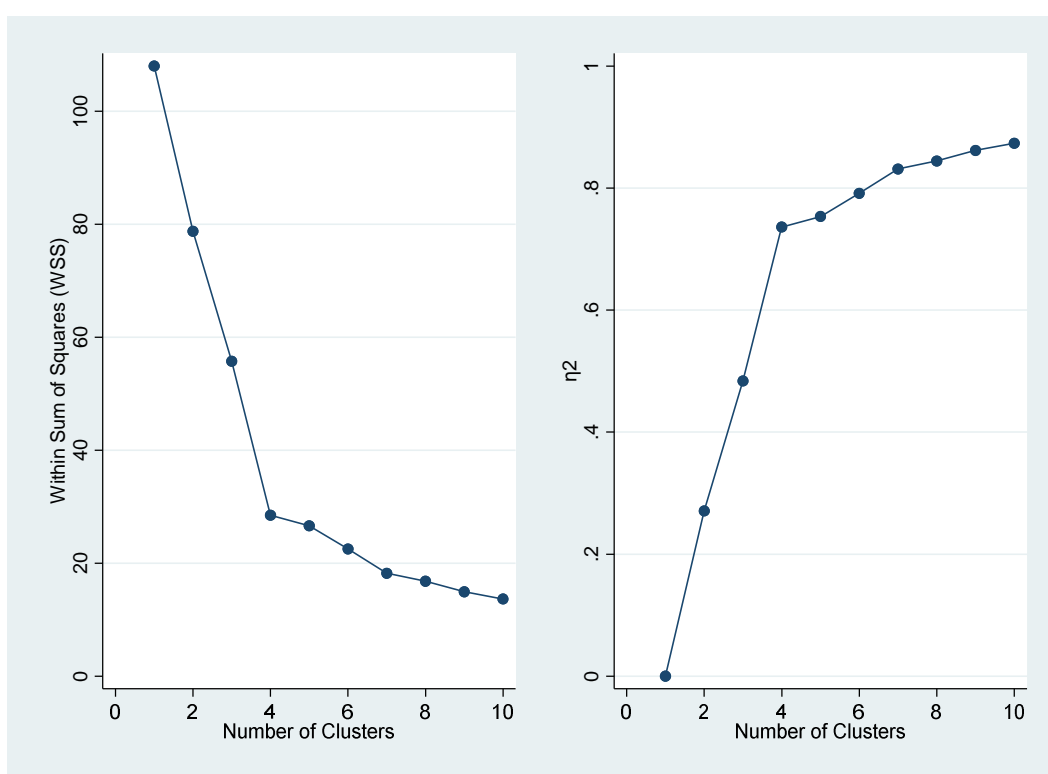
Table A4: Clustering by Classification

Cluster	Group 1	Group 2	Group 3	Group 4	Total
Extractive	4	10	2	0	16
Smallholder	2	0	14	5	21
Total	6	10	16	5	37

Notes: Compared to Table A1, Chad and Congo DR are omitted (due to a lack of data on mineral exports); Angola, Gabon (both clustered into Group 1), Sudan and Zimbabwe (clustered into Group 3) are included in the cluster analysis but omitted from the poverty analysis due to lack of data.

The V-Dem dataset gives five main measures of Democracy rather than one overall measure, as shown in the first five rows of Table A5. The V-Dem democracy indices range between 0 and 1, with higher values indicating more democratic (there is no consensus threshold for being a 'democracy'). The sub-categories of equitable distribution range between -3 and +3 in the whole data set, with higher values more equitable. Although the degree of electoral democracy is slightly higher in smallholder economies (albeit with a value that is not 'democratic'), the difference is only weakly significant, and there are no significant differences in the other indicators of how democratic processes are. In contrast, there are significant differences in almost all equity-based measures, with smallholder economies being more egalitarian on average. The Egalitarian Index has three components: Equal Distribution of Resources (which contains the Education and Health measures); Equal Protection (contains measures of civil liberties for different social groups or classes); and Equal Access (covering power distribution by gender, social groups, and socio-economic position). The most pronounced differences, with smallholder economies displaying greater equity, are in distribution of resources (especially health) and protection.

Table A5: Extractive vs Smallholder, Means of Indices in 1960

Democracy Measure	Extractive (N=17)		Smallholder (N=22)		P-Value
	Mean	SD	Mean	SD	
Electoral Democracy Index	0.159	0.104	0.219	0.104	0.080*
Liberal Democracy Index	0.116	0.052	0.145	0.069	0.144
Participatory Democracy Index	0.082	0.047	0.095	0.048	0.372
Deliberative Democracy Index	0.058	0.062	0.083	0.076	0.275
Egalitarian Democracy Index	0.071	0.044	0.141	0.080	0.001***
Egalitarian Sub-Index:					
Equal Distribution of Resources	0.162	0.132	0.307	0.181	0.006***
Sub-Categories:					
Particularistic or public goods	-0.721	0.898	0.097	1.113	0.017**
Means-tested vs universal	-0.830	1.399	-0.074	1.180	0.083*
Educational Equality	-1.667	0.921	-0.997	0.942	0.032**
Health Equality	-1.640	0.819	-0.748	1.011	0.004***
Equal Protection Index	0.146	0.125	0.478	0.236	0.000***
Equal Access Index	0.196	0.164	0.318	0.235	0.064*
Settler Mortality	N=9		N=22		
	5.50	1.27	5.82	0.94	0.511

Notes: Mean and standard deviation (SD) are unweighted; p-value based on t-stat for difference between sample means, ***/**/* denote significance at the 1%/5%/10% level. V-Dem data for 1960 is available for all 39 countries in Table A1 except for Cameroon where data for 1964 (earliest available) is used. Settler mortality data is available for all 22 smallholder countries but missing for eight extractive economies: Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Zambia, and Zimbabwe.

Sources: All means calculated from V-Dem (www.v-dem.net/en/data/data-version-7-1) except Settler Mortality from Acemoglu *et al* (2001).

Although there were significant differences for the Egalitarian scores between extractive and smallholder economies in 1960, these largely faded away by the 1990s (Figure A3). The

exception is for means-tested vs universalistic policies, where smallholders retained a higher egalitarian score. The bottom two panels show education (left) and health (right) inequality. As with the public goods score [top left panel], the gap had been eliminated by about 1990. The claim that the classification captures differences around the time of independence is maintained; the subsequent improvement and convergence is encouraging (although these are of course means). Some of these measures are included in regressions in Section A4 and the smallholder-extractive significance persists.

Figure A3. Changes over time in Egalitarian Score measures
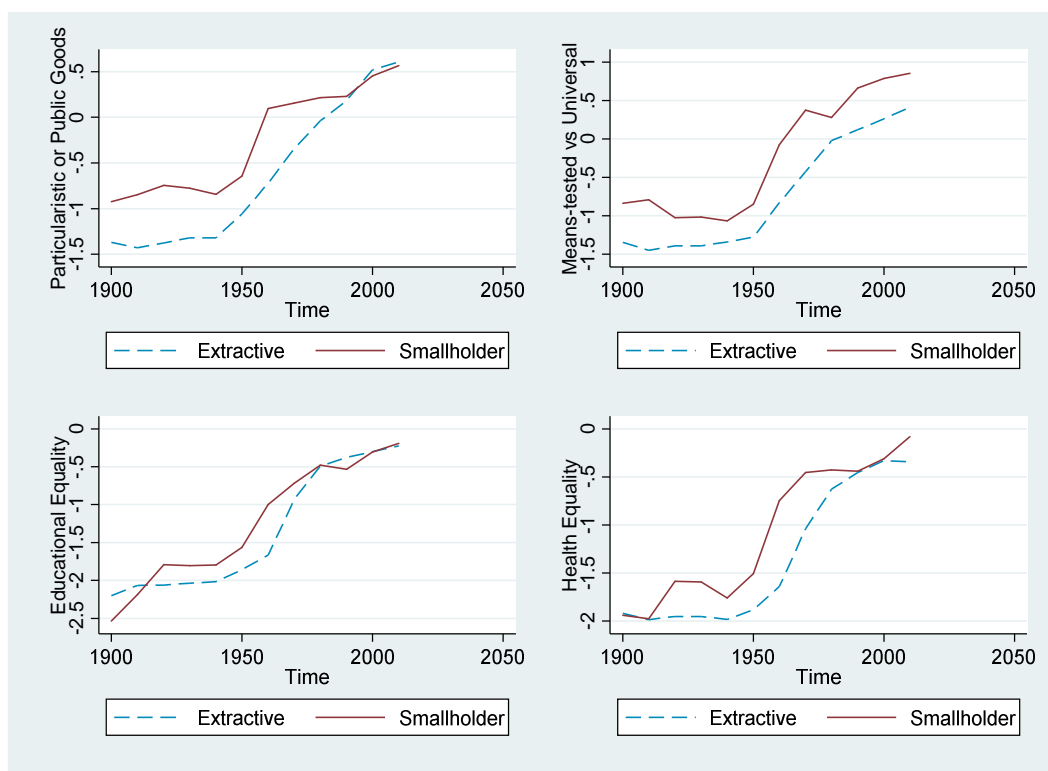
A4. Performance of Classification in Regressions with Alternative Indicators

This section extends the analysis in Table 5 of the text to check whether poverty reduction was significantly larger in SH countries accounting for other factors which may be related to the SH classification or could provide an alternative explanation for poverty falling faster in those countries. Throughout we maintain the SH-EX classification as reported in text Table 3 (comparable regressions using based on the classification from the cluster analysis are reported in Appendix C). Like Table 5, the regressions can be interpreted as a formal test of the scatter plot in text Figure 1, but controlling for the timespan poverty changes are observed for in each country and a range of other confounding factors. The coefficients on SH from these regressions suggest that on average poverty rates fell by 20-30 percentage points more in SH compared to EX countries, consistent with Figure 1.

Table A6 presents results including various equity indicators. Income inequality is the initial Gini ($Gini_0$), and changes over the period ($\Delta Gini$); pro-poor expenditure (PPE) is the period average of public spending on health and education as a percentage of GDP. The V-Dem indices are equality of access to education, initial value ($EdEq_0$) and change over the period

($\Delta EdEq$), and equality of access to health, initial value (HEq_0) and change over the period (ΔHEq). Column (2) includes growth in GDP per capita over the period (*GDPpc growth*) and initial level of GDP per capita (*GDPpc_0*) alongside the Gini terms to capture both size and distributional effects. As with the baseline results in Table 5, poverty declined significantly more in SH compared to EX, and this is not explained by differences in equity indicators with all such indicators being insignificant. Although smallholder economies tend to have lower inequality than extractive economies, including equity indicators adds very little to SH in explaining poverty reduction.

Table A6: Poverty Change with Equity Indicators, 1990-2015

	(1) dpov_in	(2) dpov_in	(3) dpov_in	(4) dpov_in	(5) dpov_in
SH	-25.298***	-21.089***	-20.073***	-25.573***	-27.259***
	(5.000)	(4.703)	(4.973)	(4.842)	(4.759)
Gini_0	-0.260	0.103			
	(0.324)	(0.424)			
ΔGini	0.467	0.732			
	(0.404)	(0.439)			
GDPpc_0		-0.002			
		(0.002)			
GDPpc growth		-0.124***			
		(0.042)			
PPE			1.436		
			(1.410)		
EdEq_0				2.140	
				(3.418)	
ΔEdEq				-0.983	
				(3.525)	
HEq_0					4.702
					(3.052)
ΔHEq					1.156
					(3.296)
N	35	35	34	35	35
R^2	0.727	0.799	0.655	0.698	0.715

Notes: As for Table 5. *PPE* captures the pro-poor orientation of policies by measuring the period average public expenditure on health and education as a percentage of GDP. *EdEq* and *HEq* are V-Dem indices of equality of access to health and education.

In Table A7, column (6) includes period averages for agricultural exports (*Agri Ex*) and mineral exports (*Mineral Ex*) as a percentage of GDP to show the effect of being SH is retained even when accounting for current natural resource utilisation. The others columns add controls to indicate the effect of institutions. These are captured through various measures: fractionalisation in ethnic, linguistic and religious terms (column 7); measures of pre-colonial state development (Gennaioli and Rainer, 2007) and indigenous slavery (Bezemer, Bolt and Lensink, 2014) in column 8; and democracy indicators, the five V-Dem democracy measures listed in Table A5 (column), and the initial level (*Polity_0*) and change ($\Delta polity$) in the Polity IV measure of democracy (column 10). Of all of these, only fractionalisation indicators are significant.

Table A7: Poverty Change with Resource and Institutions, 1990-2015

	(6)	(7)	(8)	(9)	(10)
SH	-28.71***	-15.52***	-25.05***	-23.06***	-23.41***
	(5.694)	(4.956)	(4.495)	(6.810)	(4.661)
Agri Ex	0.672				
	(0.571)				
Mineral Ex	0.112				
	(0.245)				
frac_ethnic		40.555**			
		(18.680)			
frac_ling		-24.483*			
		(11.930)			
frac_relig		30.500**			
		(13.536)			
state_dev			-14.222		
			(9.365)		
indig_slave			-2.426		
			(9.409)		
Electoral dem				-25.056	
				(104.009)	
Liberal dem				47.558	
				(76.523)	
Participatory dem				5.846	
				(75.512)	
Deliberate dem				5.418	
				(66.484)	
Egalitarian dem				-32.838	
				(90.792)	
$Polity_0$					0.199
					(0.662)
Δpolity					0.922
					(0.746)
N	33	35	34	35	35
R^2	0.736	0.769	0.721	0.689	0.719

Notes: As for Table 5. The three fractionalisation measures (ethnic, linguistic, and religious) are taken from Alesina *et al* (2003) and capture the heterogeneity of a country along the three dimensions computed as one minus the Herfindahl index of group shares, thus capturing the probability that two randomly selected individuals from the population are from different groups. The measure of pre-colonial state development is based on anthropological data of the degree of precolonial centralisation of different African ethnic groups. Each ethnic group is first categorised as being either fragmented (having either no centralised political organisation or petty chiefdoms over small districts) or centralised (large chiefdoms or states). Then data is aggregated to the country level to reflect the share of population that belongs to a centralised ethnic group. For a full derivation of the measure see Gennaioli and Rainer (2007). The indigenous slavery measure is similarly constructed from anthropological data to show the share of a country's current population who are from societies which historically had the institution of indigenous slavery, see Bezemer *et al* (2014) for more details. The Polity IV measure is a raw score ranging from -10 to 10, where values above 6 are considered democracies.

There is only a weakly significant difference in values on average between SH and EX for Electoral Democracy (Table A5), suggesting that within SH or EX economies the nature of the electoral system has some relevance for poverty reduction (although the significance may be due to only one or two countries). The Egalitarian Democracy Index (*egaldem*) is insignificant although there are highly significant difference in values on average between SH and EX (Table A5), supporting our argument that equity is an important element in classification distinguishing SH and EX economies. While higher inequality tends to be associated with poverty, it may also constrain the political impetus for redistribution: 'economic inequality increasingly stacks the deck of democracy in favor of the richest citizens' (Solt, 2008: 58). In extractive economies, economic and political inequality act in concert to weaken any impetus for poverty reduction; growth is only mildly beneficial to the poor, if at all, while democracy appears to be associated with higher poverty (perhaps reflecting an elite, rent-seeking limited form of democracy).

The main message is that the significant effect of smallholder economies achieving greater poverty reduction than extractive economies is maintained in all regressions (and at an average effect consistent with Figure 1 in the main text). The additional variables included to capture a wide range of possible confounding factors are generally not significant and, even when they are, do not appreciably alter the coefficient on smallholder economies (which is quite consistently negative in the range 20-30, lower in a few cases but never below 15 in absolute value).

A5 Robustness Checks and Further Analysis

The poverty elasticity results presented in the main text were suitable for evaluating 'long-term' poverty reduction performance by comparing the most recent level to initial observations. We now turn to see whether our classification of countries into SH and EX also affected poverty reduction over shorter spells. Table A8 estimates the elasticities as in the main text but using changes between each poverty observation for each country, similar to previous studies estimating such models (such as Bourguignon, 2003; Adams, 2004). The empirical income elasticity shown in column one of Table A8 supports our finding that the elasticity is significantly larger for SH economies, being roughly twice the size for that of EX countries. However, as controls for changes in Gini and the initial income distribution are added SH countries no longer have a significantly higher absolute income elasticity. The SH interaction term does become significant again in the fully specified model although the size of the coefficient is much smaller than in Table 6. Additionally, the overall income elasticities for SH and EX economies calculated from the model are very similar.

Thus, there is some evidence of SH countries having larger income elasticities when looking at shorter spells of poverty changes but most of the difference is due to differing initial income distributions. The income elasticities are similar to Fosu (2017) who estimates it to be -1.256 for SSA as a whole over a similar period. Kalwij and Verschoor (2007) use a similar sample to Fosu (2017) but with data only up to the mid-1990s and for the $2-a-day poverty line (which is equivalent to the current $3.20 poverty line using the 2011 PPP conversion). They estimate the income elasticity for SSA to be between -1.115 and -0.7, and the inequality elasticity to be between 0.26 and 0.50.

Table A9 re-estimates Table A8 using GMM estimation where change in log mean consumption is instrumented using lags of log consumption as well as the changes in log GDP per capita and log population, following Kalwij and Verschoor (2007), to address concerns regarding endogeneity of mean consumption mentioned previously. The evidence

for higher income elasticity in SH countries is stronger when using the GMM estimates in Table A9. Again the SH interaction term is significant for the 'naïve' and fully specified models and insignificant for the other two, however the overall income elasticities of the fully specified model are now significantly larger in SH economies.

Table A8: Poverty Elasticity Regressions using Short Run Changes (Consumption-based income)

VARIABLES	(1) d.lp190	(2) d.lp190	(3) d.lp190	(4) d.lp190	(5) d.lp190
$\Delta logCons$	-0.395***	-0.511***	-0.638***	-1.274	-2.304
	(0.119)	(0.161)	(0.133)	(1.610)	(1.840)
SH*$\Delta logCons$	-0.460**	-0.364	-0.286	-0.165*	
	(0.185)	(0.226)	(0.205)	(0.088)	
$\Delta logGini$		0.564***	0.720***	-0.354	-1.650
		(0.111)	(0.063)	(1.226)	(1.529)
SH*$\Delta logGini$					0.140
					(0.211)
$LogGini_{-1}$			0.242*	0.185**	0.185**
			(0.135)	(0.083)	(0.087)
$Log(z/Cons_{-1})$			0.095**	0.017	0.023
			(0.043)	(0.028)	(0.027)
$\Delta logCons*LogGini_{-1}$				0.098	0.341
				(0.418)	(0.477)
$\Delta logCons*Log(z/Cons_{-1})$				0.716***	0.729***
				(0.131)	(0.143)
$\Delta logGini*LogGini_{-1}$				0.176	0.503
				(0.342)	(0.380)
$\Delta logGini*Log(z/Cons_{-1})$				-2.183***	-2.179***
				(0.656)	(0.636)
SH Income elasticity				-1.288***	
				(0.162)	
EX Income elasticity				-1.235***	
				(0.150)	
SH Inequality elasticity					0.967***
					(0.140)
EX Inequality elasticity					1.333***
					(0.161)
Observations	121	121	121	121	121
Countries	35	35	35	35	35
R-squared	0.428	0.548	0.582	0.844	0.841

Notes: As for Table 6 except we look at poverty changes since the previous observation rather than the initial observation. Hence the dependent variable is change in log $1.90 a day poverty headcount since the previous observation (*d.lnp190*). The -1 subscript refers to the previous observation of a variable. All regressions are population-weighted as before but year dummies no longer included given short run changes are used. Standard errors are clustered at the country level.

Table A10 provides an alternative way to assess whether elasticities differ between SH and EX countries by estimating each set of countries separately. The results again show that the empirical income elasticity for the naïve model is significantly higher for SH economies, being about double the size of EX countries. The difference between the elasticities reduces

as additional variables are included. However, in the fully specified model the overall elasticity is significantly larger for SH economies and implies those countries experience an additional 0.5% reduction in poverty for each percentage of income growth compared to EX countries.

Table A9: GMM Poverty Elasticity Regressions using Short Run Changes
(Consumption-based income)

VARIABLES	(1) d.lp190	(2) d.lp190	(3) d.lp190	(4) d.lp190	(5) d.lp190
$\Delta logCons$	-0.802***	-1.341***	-1.310***	-11.600***	-15.082***
	(0.190)	(0.142)	(0.246)	(1.453)	(1.311)
SH*$\Delta logCons$	-0.384**	0.103	0.089	-0.255**	
	(0.184)	(0.252)	(0.291)	(0.115)	
$\Delta logGini$		0.784***	0.896***	2.672***	-0.503
		(0.086)	(0.109)	(0.870)	(2.370)
SH*$\Delta logGini$					0.356*
					(0.190)
$LogGini_{-1}$			0.243**	-0.120**	-0.143***
			(0.123)	(0.051)	(0.037)
$Log(z/Cons_{-1})$			0.077**	-0.060***	-0.050***
			(0.034)	(0.017)	(0.011)
$\Delta logCons*LogGini_{-1}$				2.951***	3.829***
				(0.377)	(0.355)
$\Delta logCons*Log(z/Cons_{-1})$				1.489***	1.544***
				(0.063)	(0.080)
$\Delta logGini*LogGini_{-1}$				-0.612***	0.208
				(0.226)	(0.608)
$\Delta logGini*Log(z/Cons_{-1})$				-1.712***	-1.532***
				(0.127)	(0.132)
SH Income elasticity				-1.463***	
				(0.044)	
EX Income elasticity				-0.868***	
				(0.090)	
SH Inequality elasticity					1.060***
					(0.061)
EX Inequality elasticity					1.029***
					(0.062)
Observations	89	89	89	89	89
Countries	31	31	31	31	31
R-squared	0.582	0.704	0.704	0.933	0.923

Notes: As for Table A8 but estimated using GMM where *ΔlogCons* is instrumented using *ΔlogGDPpc*, changes in log population, and lags of *logCons* following Kalwij and Verschoor (2007).

Table A10: Split-Sample Poverty Elasticity Regressions (Consumption-based income)

	(1) SH	(1) EX	(2) SH	(2) EX	(3) SH	(3) EX	(4) SH	(4) EX
$\Delta logCons$	-0.82***	-0.41***	-0.84***	-0.53***	-0.92***	-0.62***	3.18	0.29
	(0.155)	(0.120)	(0.173)	(0.167)	(0.179)	(0.139)	(3.035)	(0.892)
$\Delta logGini$			0.516**	0.603***	0.742***	0.693***	-1.323	-2.240
			(0.191)	(0.101)	(0.151)	(0.097)	(2.146)	(1.642)
$LogGini_{-1}$					0.359***	0.127	0.527***	0.057
					(0.109)	(0.138)	(0.144)	(0.099)
$Log(z/Cons_{-1})$					0.075	0.078**	0.024	0.012
					(0.077)	(0.029)	(0.021)	(0.025)
$\Delta logCons*LogGini_{-1}$							-1.185	-0.271
							(0.802)	(0.237)
$\Delta logCons*Log(z/Cons_{-1})$							1.022***	0.457***
							(0.183)	(0.042)
$\Delta logGini*LogGini_{-1}$							0.446	0.684
							(0.555)	(0.435)
$\Delta logGini*Log(z/Cons_{-1})$							-3.31***	-1.27***
							(0.809)	(0.186)
Income elasticity							-1.46***	-0. 98***
							(0.142)	(0.026)
Inequality elasticity							1.276***	1.013***
							(0.157)	(0.070)
Observations	76	45	76	45	76	45	76	45
Country	21	14	21	14	21	14	21	14
R-squared	0.424	0.316	0.493	0.636	0.524	0.680	0.865	0.951

Notes: As for Table A8 except SH interaction terms are dropped and separate regressions for SH and EX countries are estimated.

The evidence for larger income elasticities in SH countries is much stronger when we use GDP per capita to measure average incomes, as shown in Table A11, instead of mean consumption. In the first three columns, where constant income elasticity is assumed, the income elasticity for EX countries is insignificant or barely significant, implying GDP growth has had little effect in reducing poverty in those countries. The SH interaction term retains significance throughout these models and implies the elasticity for SH countries is four times larger than that of EX. In the fully specified model the SH interaction remains highly significant and indicates income elasticity of SH countries would be larger by 1.1 if initial income distributions were equal. Even after allowing for differing distributions the SH elasticity is still twice that of EX.

The results using changes from previous observation are qualitatively similar to the main results, particularly when income growth is measured using GDP per capita. Given the problems with using mean consumption from the survey data discussed previously, elasticities based on GDP are likely to be more reliable. Furthermore, the GDP elasticities are arguably of more interest given growth in GDP per capita is the standard measure of income growth. The estimated elasticities are lower in absolute terms when analysing shorter run changes. This is to be expected as a number of countries experience large poverty

reduction for a certain period and then limited reductions in subsequent periods, which attenuates elasticity estimates when considering each individual period separately rather than overall changes.

Table A11: Poverty Elasticity Regressions using Short Run Changes (GDP per capita)

VARIABLES	(1) d.lp190	(2) d.lp190	(3) d.lp190	(4) d.lp190	(5) d.lp190
$\Delta logGDPpc$	-0.188*	-0.196	-0.191	5.859*	0.402
	(0.105)	(0.133)	(0.120)	(3.079)	(2.982)
$SH*\Delta logGDPpc$	-0.537**	-0.606**	-0.628**	-1.122***	
	(0.251)	(0.234)	(0.295)	(0.287)	
$\Delta logGini$		0.510***	0.480***	4.264*	1.936
		(0.092)	(0.096)	(2.121)	(3.572)
$SH*\Delta logGini$					0.533
					(0.514)
$LogGini_{-1}$			-0.051	0.024	0.041
			(0.194)	(0.284)	(0.322)
$Log(z/GDPpc_{-1})$			-0.005	-0.049	-0.034
			(0.032)	(0.059)	(0.064)
$\Delta logGDPpc*LogGini_{-1}$				-1.476*	-0.208
				(0.849)	(0.854)
$\Delta logGDPpc*Log(z/GDPpc_{-1})$				0.414*	0.073
				(0.221)	(0.347)
$\Delta logGini*LogGini_{-1}$				-1.072*	-0.561
				(0.580)	(0.823)
$\Delta logGini*Log(z/GDPpc_{-1})$				-0.335**	-0.557*
				(0.145)	(0.277)
SH Income elasticity				-0.936***	
				(0.207)	
EX Income elasticity				-0.457***	
				(0.172)	
SH Inequality elasticity					0.763***
					(0.117)
EX Inequality elasticity					0.562***
					(0.217)
Observations	121	121	121	121	121
Country	35	35	35	35	35
R-squared	0.139	0.240	0.240	0.324	0.229

Notes: As for Table A8 except income measured as GDP per capita in PPP terms (*GDPpc*).

Another concern with the estimates based on total changes is that weighting by population may mean the results are driven by a few populous countries, in particular Nigeria which accounted for more than 20% of the total sample population in 2010 as well as about 40% of the population of EX countries. To address these concerns we re-estimate Table 6 without the population weights (Table A12) and with weights but dropping Nigeria (Table A13). The results are qualitatively identical and arguably make a stronger case for SH economies having larger income elasticities particularly for the fully specified model.

Table A12: Unweighted Poverty Elasticity Regressions (Consumption-based income)

	(1) $\Delta lnp190$	(2) $\Delta lnp190$	(3) $\Delta lnp190$	(4) $\Delta lnp190$	(5) $\Delta lnp190$
$\Delta logCons$	-0.622***	-0.644***	-0.925***	-0.377	-5.817**
	(0.189)	(0.188)	(0.217)	(2.596)	(2.600)
SH*$\Delta logCons$	-0.718***	-0.642***	-0.646**	-0.815***	
	(0.215)	(0.222)	(0.264)	(0.228)	
$\Delta logGini$		0.411	0.525	5.105	3.352
		(0.337)	(0.441)	(3.501)	(4.955)
SH*$\Delta logGini$					-0.834
					(1.052)
$LogGini_0$			0.209	-0.138	0.468
			(0.502)	(0.331)	(0.449)
$Log(z/Cons_0)$			0.415***	0.045	0.191
			(0.145)	(0.102)	(0.126)
$\Delta logCons*LogGini_0$				-0.117	1.182*
				(0.657)	(0.680)
$\Delta logCons*Log(z/Cons_0)$				0.529***	0.644***
				(0.105)	(0.132)
$\Delta logGini*LogGini_0$				-1.239	-0.312
				(0.970)	(1.207)
$\Delta logGini*Log(z/Cons_0)$				-2.172***	-0.898
				(0.580)	(0.740)
SH Income elasticity				-1.676***	
				(0.129)	
EX Income elasticity				-1.015***	
				(0.146)	
SH Inequality elasticity					1.436***
					(0.244)
EX Inequality elasticity					2.396**
					(0.994)
Observations	35	35	35	35	35
R-squared	0.725	0.739	0.815	0.960	0.937

Notes: As for Table 6 except regressions are left unweighted.

We also consider the effect of being SH using two higher poverty lines; $3.20-a-day measure (Table A14) and the $5.50-a-day measure (Table A15). For the both poverty lines the models where a constant income elasticity is assumed (i.e. the first three columns), the effect on income growth on poverty for EX countries is barely significant and becomes insignificant once initial Gini and initial level of development are controlled for. In contrast, the SH interaction term remains negative and highly significant particularly for the $3.20 measure and as more controls are added. The size of the interaction term also implies income elasticities are two to three times larger in SH economies. In the fully specified model, the SH interaction term becomes less significant or loses significance completely (for $5.50 measure) although the overall elasticities for SH economies are significantly larger. This indicates that for higher poverty lines, the larger income elasticity of poverty in SH countries is mainly due to differences in initial income distributions. However, for extreme poverty ($1.90 measure) other features than the initial distribution is driving the difference.

Table A13: Poverty Elasticity Regressions excluding Nigeria
(Consumption-based income)

	(1) $\Delta lnp190$	(2) $\Delta lnp190$	(3) $\Delta lnp190$	(4) $\Delta lnp190$	(5) $\Delta lnp190$
$\Delta logCons$	-0.426**	-0.428**	-0.661***	-5.055**	-3.707
	(0.179)	(0.184)	(0.208)	(2.402)	(3.040)
SH*$\Delta logCons$	-0.734***	-0.731***	-0.808***	-0.619***	
	(0.192)	(0.199)	(0.245)	(0.198)	
$\Delta logGini$		0.022	0.100	7.463*	8.910
		(0.304)	(0.404)	(4.248)	(5.290)
SH*$\Delta logGini$					-2.655**
					(1.217)
$LogGini_0$			-0.033	-0.491	0.677
			(0.454)	(0.381)	(0.432)
$Log(z/Cons_0)$			0.290**	-0.027	0.193*
			(0.113)	(0.103)	(0.110)
$\Delta logCons*LogGini_0$				1.112*	0.629
				(0.626)	(0.812)
$\Delta logCons*Log(z/Cons_0)$				0.632***	0.696***
				(0.108)	(0.118)
$\Delta logGini*LogGini_0$				-1.836	-1.332
				(1.163)	(1.252)
$\Delta logGini*Log(z/Cons_0)$				-1.172**	-0.434
				(0.530)	(0.586)
SH Income elasticity				-1.599***	
				(0.127)	
EX Income elasticity				-0.836 ***	
				(0.171)	
SH Inequality elasticity					1.337***
					(0.217)
EX Inequality elasticity					3.763***
					(1.126)
Observations	34	34	34	34	34
R-squared	0.832	0.832	0.884	0.970	0.964

Notes: As for Table 6 except Nigeria is excluded.

Table A14: Poverty Elasticity Regressions using \$3.20 (Consumption-based income)

	(1) $\Delta lnp320$	(2) $\Delta lnp320$	(3) $\Delta lnp320$	(4) $\Delta lnp320$	(5) $\Delta lnp320$
$\Delta logCons$	-0.252*	-0.231*	-0.247	-3.770*	-4.755*
	(0.126)	(0.121)	(0.146)	(1.873)	(2.470)
SH*$\Delta logCons$	-0.397***	-0.449***	-0.551***	-0.274*	
	(0.137)	(0.133)	(0.161)	(0.158)	
$\Delta logGini$		-0.389*	-0.556*	1.600	-0.023
		(0.201)	(0.281)	(3.192)	(3.308)
SH*$\Delta logGini$					-0.245
					(0.678)
$LogGini_0$			-0.231	-0.337	-0.041
			(0.293)	(0.260)	(0.349)
$Log(z/Cons_0)$			0.106	-0.077	-0.010
			(0.079)	(0.085)	(0.087)
$\Delta logCons*LogGini_0$				0.834*	1.042
				(0.483)	(0.653)
$\Delta logCons*Log(z/Cons_0)$				0.455***	0.477***
				(0.089)	(0.094)
$\Delta logGini*LogGini_0$				-0.383	0.167
				(0.883)	(0.875)
$\Delta logGini*Log(z/Cons_0)$				-0.354	-0.130
				(0.441)	(0.452)
SH Income elasticity				-0.750***	
				(0.079)	
EX Income elasticity				-0.449***	
				(0.131)	
SH Inequality elasticity					0.302*
					(0.176)
EX Inequality elasticity					0.585
					(0.702)
Observations	35	35	35	35	35
R-squared	0.762	0.791	0.842	0.942	0.934

Notes: As for Table 6 except \$3.20 a day poverty line is used.

Table A15: Poverty Elasticity Regressions using \$5.50 (Consumption-based income)

	(1) $\Delta lnp550$	(2) $\Delta lnp550$	(3) $\Delta lnp550$	(4) $\Delta lnp550$	(5) $\Delta lnp550$
$\Delta logCons$	-0.130*	-0.112*	-0.103	-2.600**	-2.957**
	(0.073)	(0.065)	(0.078)	(1.037)	(1.309)
SH4*$\Delta logCons$	-0.154*	-0.196**	-0.271***	-0.091	
	(0.079)	(0.072)	(0.085)	(0.086)	
$\Delta logGini$		-0.317***	-0.447***	0.318	-0.275
		(0.108)	(0.149)	(1.732)	(1.709)
SH4*$\Delta logGini$					-0.072
					(0.357)
$LogGini_0$			-0.179	-0.239	-0.144
			(0.156)	(0.142)	(0.183)
$Log(z/Cons_0)$			0.046	-0.044	-0.023
			(0.042)	(0.047)	(0.046)
$\Delta logCons*LogGini_0$				0.571**	0.647*
				(0.264)	(0.344)
$\Delta logCons*Log(z/Cons_0)$				0.243***	0.251***
				(0.049)	(0.049)
$\Delta logGini*LogGini_0$				-0.113	0.071
				(0.483)	(0.461)
$\Delta logGini*Log(z/Cons_0)$				-0.018	0.056
				(0.241)	(0.238)
SH Income elasticity				-0.331***	
				(0.043)	
EX Income elasticity				-0.212***	
				(0.072)	
SH Inequality elasticity					-0.030
					(0.092)
EX Inequality elasticity					0.042
					(0.370)
Observations	35	35	35	35	35
R-squared	0.678	0.756	0.820	0.930	0.927

Notes: As for Table 6 except \$5.50 a day poverty line is used.

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Appendix B: Poverty Measures

There is disagreement on the trends in poverty reduction in Africa. The optimistic view argues that aggregate poverty in Africa is falling faster than the official poverty statistics indicate, typically by deriving estimates from national accounts data. Inferring poverty trends from the consumption component of GDP, as done by Pinkovskiy and Sala-i-Martin (2010), is however likely to overstate poverty reduction (McKay, 2013; Ravallion, 2000). Nevertheless, carefully analysed household surveys that are more informative on poverty trends (Deaton 2005) are also generally optimistic. McKay (2013) reviews evidence from household survey data for 25 SSA countries to demonstrate significant achievements in poverty reduction, albeit with variation across countries and at a lower rate than claimed by Pinkovskiy and Sala-i-Martin (2010).

The pessimistic view argues that, because national accounts data in SSA are of such low quality, GDP and derived growth measures are inaccurate and poverty is probably higher than estimated (Jerven, 2013). Although the statistical difficulties are valid, the inferences drawn are overstated: there is little doubt that the majority of SSA countries have experienced more than fifteen years of significant growth; there may be inaccuracies in GDP but relative levels and growth rates within SSA are likely to represent meaningful experience. The pessimistic view is also sceptical of household survey data given practical problems in, for example, defining and measuring 'the household' and informal employment (Jerven and Johnston, 2015). Such limitations do not imply that survey data are uninformative, and there is robust evidence of long-term poverty reduction in several countries. For example, Ghana and Uganda have managed to halve poverty over the last twenty years (Aryeetey and McKay, 2007; Okidi *et al*, 2007).

The analysis in the paper uses World Bank PovcalNet data because it provides the most comprehensive and consistent coverage of headcount poverty. This is not to suggest the data are without problems, especially for SSA. For many SSA countries there are only one or two surveys since 1990, and even where there are more they not be comparable for estimating poverty. As noted in text Table 3, for 14 of the 30 countries listed a majority of surveys were not comparable; the three surveys for Guinea-Bissau (one of the countries that 'failed' the cluster analysis above) were not fully comparable (Beegle *et al*, 2016: 32). However, their analysis was limited to available surveys up to 2012, whereas we do have some further surveys as our end date is 2015 (and recent surveys tend to be more comparable). Furthermore, for SSA overall the problem may not be severe: the full PovcalNet data tends to overestimate headcount poverty on average compared to using only comparable and high quality surveys, but the difference is very small (Beegle *et al*, 2016: 58). While recognising the limitations, given the general lack of data for SSA it is most appropriate to aim to use all that is available.

A related concern is that poverty data for particular countries are contested because alternative sources give different estimates. South Africa is perhaps an extreme example where apparently the same source, national surveys, can give very different estimates of levels and trends in poverty, as it has multiple and often conflicting measures of poverty (Mosley, 2013, Appendix part (iii)). Leibbrandt *et al* (2010: tables 2.10 and 2.11) suggest that between 1993 and 2008 aggregate poverty declined very slightly from 56% to 54%, although it increased within the Coloured population. World Bank Povcal data using a $1.25

per day poverty line suggests a much lower level (24% in 1993) and much greater reduction to 9% by 2011, whereas national poverty line data suggest increasing poverty (Table B1).

Table B1: Comparable National Poverty Line Data

Country	Time Period	Years	Surveys	National Poverty Headcount		
				Initial	Current	% Δpa
Rwanda	2006 - 2011	5	2	56.7	44.9	-4.16
Ghana	2006 - 2012	6	2	31.9	24.2	-4.02
Namibia	1994 - 2009	15	3	69.3	28.7	-3.91
Uganda	1992 - 2009	17	6	56.4	24.5	-3.33
Botswana	1990 - 2009	19	4	44.1	19.3	-2.96
Sierra Leone	2003 - 2011	8	2	66.4	52.9	-2.54
Mali	2001 - 2010	9	3	55.6	43.6	-2.40
Cameroon	1996 - 2007	11	3	53.3	39.9	-2.29
Mauritania	2000 - 2008	8	3	51	42	-2.21
Ethiopia	1995 - 2011	16	4	45.5	29.6	-2.18
Malawi	1998 - 2010	12	3	65.3	50.7	-1.86
Chad	2003 - 2011	8	2	54.8	46.7	-1.85
Mozambique	1996 - 2009	13	3	69.4	54.7	-1.63
Senegal	2001 - 2011	10	3	55.2	46.7	-1.54
Burkina Faso	2003 - 2009	6	2	51.1	46.7	-1.44
Congo, Rep.	2005 - 2011	6	2	50.7	46.5	-1.38
Swaziland	2001 - 2009	8	2	69	63	-1.09
Togo	2006 - 2011	5	2	61.7	58.7	-0.97
Lesotho	1994 - 2010	16	3	66.6	57.1	-0.89
Nigeria	2004 - 2010	6	2	48.4	46	-0.83
Guinea	1994 - 2012	18	4	62.6	55.2	-0.66
Benin	2006 - 2011	5	4	37.2	36.2	-0.54
Madagascar	2001 - 2010	9	3	70.8	75.3	0.71
Guinea-Bissau	2002 - 2010	8	2	64.7	69.3	0.89
South Africa	1995 - 2011	16	4	31	45.5	2.92
Côte d'Ivoire	1990 - 2008	18	5	25.4	42.7	3.78

Source: Comparable national poverty lines as reported in the World Bank Poverty and Equity Dataset (SI.POV.NAHC).

Tanzania is another example of a country where alternative data sources provide differing evidence. The $1.25 a day Povcal data suggests that poverty fell from a headcount of 72% in 1992 to about 44% in 2012, implying that poverty fell by almost 40 per cent over some 20 years. The national poverty line derived from the Tanzania Household Budget Surveys suggests much lower levels and declines in consumption poverty: over the same 20 years poverty fell by only 27 per cent, from 38.6% in 1991/92 to 28.2% in 2011/12. Arndt *et al* (2015) show that differences in the price deflator used (and of course the purchasing power parity conversion) explain much of the difference between consumption poverty rates derived from national survey data compared to Povcal estimates. The major reason why

growth since 2000 did not translate into commensurate poverty reduction was the lack of growth in real household consumption; the relatively high GDP growth since 2000 was in components other than private consumption, in particular the mining sector (Arndt *et al*, 2015: 4).

Nigeria is known to have mutually inconsistent statistical sources, so that agencies such as FAO and US Department of Agriculture constructed their own datasets to challenge the Federal Bureau of Statistics estimates (Mosley, 1991). For example, World Bank (2013) reports a 2011 headcount poverty level of 62%, compared to Federal Bureau of Statistics estimates of 67% in 2010 and 72% in 2011 (see Charles Soludo, www. nairaland.com/1114429/breaking-dynasties-poverty-nigeria, 20 March 2013). The World Bank challenges the Bureau of Statistics estimates of Nigerian poverty rates (see www. nairaland.com/1065936/no-reliable-statistics-nigerias-poverty#12431904, 5 October 2012). Beegle *et al* (2016: 59) observe that alternative Nigerian survey data suggest very different levels of poverty, with the gap as extreme as 53% or 26% around 2010, and even different trends over time. As Nigeria alone accounts for 18% of the SSA population, poverty in the country can affect regional estimates. However, the effect appears small as even if Nigeria is omitted trends over 1990 to 2012 are very similar (Beegle *et al*, 2016: 58).

The final concern to address is that internationally comparable (Povcal) measures may differ from national poverty line estimates. Appendix Table B1 reports poverty trends using the national poverty line; the sample is smaller than used in the paper (especially for the number of observations) but average poverty reduction is much greater using national lines. This may be because although the international poverty line is often not much higher than the national line, a large number of households are clustered around the poverty lines so a small change in the line can have a large impact on the poverty headcount; this was the case in Tanzania (World Bank, 2015: 20). In separate analysis (available on request), using data to 2012, we compare results using Povcal with $1.25 Povcal and national poverty lines. The core result that Smallholder economies outperform Extractive economies in poverty reduction remains.

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Appendix C: Replication with Cluster Analysis Grouping

Tables C1-C3 replicate the results of text Tables 5-7 using the cluster sample. As indicated in Appendix A3 above, 37 countries were included in the cluster analysis. This sample included four countries (Angola, Gabon, Sudan and Zimbabwe) omitted from the analysis in the paper due to lack of poverty data and these are excluded from the analysis below. The cluster analysis excluded two countries (Congo DR and Chad) included in the analysis of the paper so these are also excluded. Thus, the differences compared to Tables 5-7 are that: i) Madagascar is classified as SH instead of EX; ii) Liberia and Mauritania are classified as EX instead of SH; and iii) Congo DR and Chad are omitted. The sample here is therefore 33 countries compared to 35 in the paper, with three reclassified.

Table C1: Smallholder Classification and Changes in Poverty

	(1)	(2)	(3)	(4)	(5)	(6)
	$\Delta p190$	$\Delta p190$	$\Delta p190$	$\Delta p190$	$\Delta p190$	$\Delta p190$
SH	-21.300***	-19.759***	-22.221***	-25.033***	-19.748**	-24.201***
	(5.933)	(5.108)	(5.854)	(7.073)	(7.219)	(7.151)
GDPpc growth		-0.154***				
		(0.047)				
latitude			-2.595**			
			(0.947)			
longitude			-0.716*			
			(0.375)			
*latitude*longitude*			0.082**			
			(0.033)			
Southern Africa				-8.606		
				(14.967)		
Western Africa				-2.107		
				(14.062)		
Eastern Africa				1.566		
				(13.575)		
British colony					10.445	
					(7.567)	
Portuguese colony					-5.089	
					(15.496)	
Belgian colony					8.628	
					(16.881)	
Settler Mortality						3.112
						(1.859)
N	33	33	33	33	33	26
R^2	0.550	0.681	0.664	0.571	0.592	0.615

Notes: As for Table 5 but using the classification from the K-means cluster analysis in Appendix A3 above.

The replication supports the main results from the analysis in the paper. The coefficients on SH in Table C1 are slightly smaller (by 2-5 units) but remain large and significant. The coefficients on growth, latitude and longitude are slightly smaller but still significant (the interaction is smaller and less significant). The only other notable difference is that Settler Mortality is no longer significant.

Table C2: Poverty Elasticity Regressions (Consumption-based income)

VARIABLES	(1) $\Delta lnp190$	(2) $\Delta lnp190$	(3) $\Delta lnp190$	(4) $\Delta lnp190$	(5) $\Delta lnp190$
$\Delta logCons$	-0.656***	-0.664***	-0.832***	-4.790	-3.280
	(0.223)	(0.227)	(0.255)	(2.812)	(3.972)
SH*$\Delta logCons$	-0.514**	-0.494*	-0.479	-0.292	
	(0.236)	(0.243)	(0.281)	(0.292)	
$\Delta logGini$		0.157	0.448	3.903	0.709
		(0.324)	(0.452)	(5.554)	(4.802)
SH*$\Delta logGini$					-1.004
					(1.088)
$LogGini_0$			0.419	0.063	0.714
			(0.478)	(0.438)	(0.606)
$Log(z/Cons_0)$			0.330**	0.008	0.169
			(0.139)	(0.150)	(0.158)
$\Delta logCons*LogGini_0$				1.024	0.574
				(0.723)	(1.043)
$\Delta logCons*Log(z/Cons_0)$				0.679***	0.595***
				(0.141)	(0.140)
$\Delta logGini*LogGini_0$				-0.776	0.404
				(1.526)	(1.349)
$\Delta logGini*Log(z/Cons_0)$				-1.015	-0.668
				(0.638)	(0.704)
SH income elasticity				-1.333***	
				(0.114)	
EX income elasticity				-1.181***	
				(0.243)	
SH inequality elasticity					1.290***
					(0.274)
EX inequality elasticity					2.605**
					(1.087)
Observations	33	33	33	33	33
R-squared	0.824	0.826	0.865	0.960	0.959

Notes: As for Table 6 but using the classification from the K-means cluster analysis in Appendix A3 above.

The results in Table C2 tend to have lower significance than in Table 6, but are broadly similar. The coefficients on $\Delta logCons$ are slightly larger (and again only significant in columns 1-3) while coefficients on SH*$\Delta logCons$ are smaller and less significant (losing significance in columns 3 and 4). The coefficients on $\Delta logCons*Log(z/Cons_0)$ are slightly smaller but still significant, while $\Delta logGini*Log(z/Cons_0)$ loses significance (column 4). The SH elasticities are somewhat smaller whereas the EX elasticities are a bit larger, and significance levels are similar. Consequently, the difference between income elasticities has decreased, whereas the difference in inequality elasticities increased.

The results in Table C3 are similar to Table 7. The coefficients on SH*$\Delta logCons$ are similar but less significant in columns 2 and 3; there are no other notable differences in coefficients. The SH elasticities are similar, the EX elasticities are larger and the EX inequality elasticity becomes significant. In contrast to the case of consumption-based income (Table C2), for GDP per capita in Table C3 the SH income elasticity is smaller than the EX income elasticity, although the significance level is low and the difference between the SH and EX may not be significant. The EX inequality elasticity is much larger, especially GDP per capita, confirming the conclusion that inequality has a more detrimental effect on poverty in EX countries.

Table C3: Poverty Elasticity Regressions (GDP per capita)

VARIABLES	(1) $\Delta lnp190$	(2) $\Delta lnp190$	(3) $\Delta lnp190$	(4) $\Delta lnp190$	(5) $\Delta lnp190$
$\Delta logCons$	0.048	0.023	0.037	10.055	2.332
	(0.377)	(0.386)	(0.459)	(8.213)	(8.645)
SH*$\Delta logCons$	-0.922***	-0.889**	-0.945**	-1.216***	
	(0.322)	(0.332)	(0.392)	(0.415)	
$\Delta logGini$		0.251	0.204	-2.633	2.807
		(0.480)	(0.683)	(11.060)	(12.585)
SH*$\Delta logGini$					-2.556
					(1.738)
$LogGini_0$			-0.100	0.471	1.187
			(0.591)	(0.964)	(1.335)
$Log(z/GDPpc_0)$			0.030	-0.261	-0.006
			(0.143)	(0.322)	(0.428)
$\Delta logGDPpc*LogGini_0$				-2.578	-0.886
				(2.147)	(2.332)
$\Delta logGDPpc*Log(z/GDPpc_0)$				1.143*	0.688
				(0.610)	(0.730)
$\Delta logGini*LogGini_0$				0.489	-0.081
				(2.960)	(3.368)
$\Delta logGini*Log(z/GDPpc_0)$				-1.807	-1.733
				(1.219)	(1.392)
SH income elasticity				-1.346***	
				(0.334)	
EX income elasticity				-1.507*	
				(0.783)	
SH inequality elasticity					0.785
					(0.692)
EX inequality elasticity					4.940**
					(2.374)
Observations	33	33	33	33	33
R-squared	0.612	0.617	0.619	0.731	0.650

Notes: As for Table 7 but using the classification from the K-means cluster analysis in Appendix A3 above.