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Fair ways to share benefits from community forests? How commodification is associated with reduced preference for equality and poverty alleviation

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5 **Fair ways to share benefits from community forests? How commodification is**
6 **associated with reduced preference for equality and poverty alleviation.**
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27 **Keywords**

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29 Commodification, community forests, environmental justice, fairness, benefit sharing
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33 **Abstract**

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35 This research is concerned with the trend towards commodification of forestry, in the context
36 of community forest governance for sustainable development in the tropics. In these contexts,
37 commodification takes different forms, including sales of certified timbers and sales of
38 carbon credits. In addition to the general aim to enhance income, these market-based forestry
39 interventions typically aim to align with sustainable development agendas, including a)
40 safeguarding ecological integrity and b) promoting poverty alleviation. Our concern here is
41 that the process of forest commodification might lead to a shift in local norms of benefit-
42 sharing, in ways that can hinder these key components of sustainable development goals. We
43 report the results of a survey (N=519) conducted across sites in Bolivia, China and Tanzania
44 that shows that switching from non-monetary to monetary benefits is associated with
45 changes in preferences for distributional fairness in ways that may be detrimental to the poor.
46 In particular, we show that forest commodification is associated with a lower likelihood of
47 selecting pro-poor or egalitarian approaches to benefit sharing and higher likelihood of
48 selecting to distribute benefits in a way that rewards individual contributions or compensates
49 losses.
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Introduction

In *Antigone*, the character Creon claims that ‘There’s nothing in the world so demoralising as money’ whilst D.H Lawrence observed that ‘Money poisons you when you’ve got it, and starves you when you haven’t’ (Lawrence, 1994 [1928]). Most academic research into this phenomena focuses on the institutional arrangements surrounding monetary exchange, identifying market exchange as a driver of declining social responsibility (Polanyi, 1944, Falk and Szech, 2013, Bartling et al., 2014, Sandel, 2012, Satz, 2010). More recently, evidence has emerged that money itself – indeed even brief exposure to an image or symbol of money – can erode our empathy and responsibility towards others (Caruso et al., 2013, Vohs et al., 2006, Kouchaki et al., 2013). In the context of environmental conservation, this raises concern because virtues associated with social responsibility, including compassion, reciprocity, trust and cooperation, are often essential requirements for successful environmental governance (Ostrom, 1990) and are also widely held to be central requirements - or capabilities - for achieving human wellbeing (Nussbaum, 2011). To put this in a way that has underpinned mainstream environmentalism for at least three decades, social equity is a necessary condition for achieving sustainable development (WCED, 1987, Pearce et al., 1989, Holden et al., 2017).

Our particular interest in this paper is the commodification of forests within the context of community forestry in the tropics. Communities are increasingly supported to develop money-based forest economies through what are generically termed market-based instruments (MBIs). In our case locations, these include the marketing of forest timbers through forest certification and labelling schemes, payments for ecosystem services (PES) schemes for carbon offsetting and soil stabilisation and development of ecotourism products. Whilst we adopt the convention of collectively describing these as ‘market-based’, many PES schemes involve government or NGO procurement in the absence of competitive market institutions (Gómez-Baggethun and Muradian, 2015, Calvet-Mir et al., 2015, Ferraro, 2009, Milne and Adams, 2012). What defines MBIs in this research is therefore the progression from non-monetary to monetary benefits from managing local forests. This change is often associated with a shift in the kind of goods and services that are valued and exploited. For example, the United Nations’ programme on Reducing Emissions from Deforestation and Forest Degradation (REDD+) has newly valorised the carbon stored in forest biomass as a basis for paying forest managers in the tropics for conserving or enhancing their forest stock (Corbera, 2012).

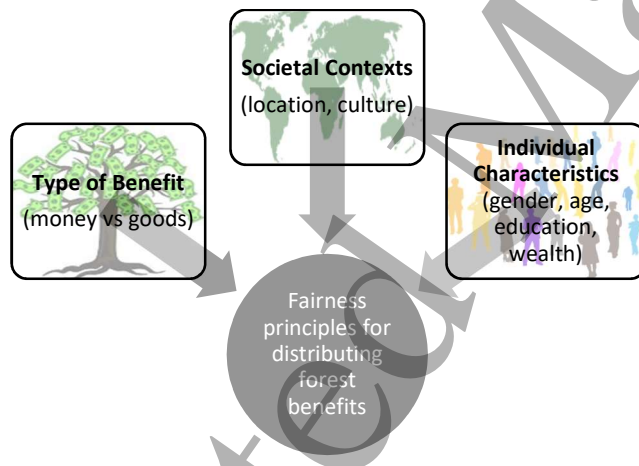
The commodification of local forest economies has the potential to bring important new income streams to local communities and to incentivise forest conservation over conversion to other land uses. However, there are concerns about how well such development and conservation objectives are being met. For example, reviews find that there is currently insufficient evidence to conclude that these objectives have been widely achieved in practice by either certification schemes (Blackman and Rivera 2011, Romero et al. 2013) or PES schemes (Börner et al., 2017, Samii et al., 2014, Muradian et al., 2013). But critiques of MBIs go beyond concerns about effectiveness, to include fears that commodification of environmental stewardship erodes the moral basis for caring, both for nature and for other people. Previous research has found that MBIs can foster mentalities in which inequitable distribution of costs and benefits are conceived as acceptable (Caney, 2010, O’Neill, 2016,

Spash, 2010) and in which monetary incentives crowd out superior motives for caring for nature (García-Amado et al., 2013, Bowles, 2008, Agrawal et al., 2015, Bolderdijk et al., 2013, Rode et al., 2015, Corbera, 2012, Sandel, 2012, Neuteleers and Engelen, 2015).

This paper adds to this literature through field-based empirical research into the effects of forest commodification on principles of fairness within local communities. In particular, we investigate whether commodification changes conceptions of fairness in ways that appear to diminish concern about poverty and inequality. In line with the United Nations Sustainable Development Goals (SDGs) we assume that both the prioritisation of the poorest and the pursuit of equality (e.g. ‘leave no one behind’) are important conditions for progress towards sustainable development. If commodification of forests is diminishing the salience of these norms, this might be a hindrance to progress towards sustainable development.

Our focus here is on the conceptions of fairness held within local communities. This is increasingly pertinent for the governance of forest resources because of the increasing proportion of forests in low and middle income countries that are coming under forms of community management (Larson et al., 2017). We investigate the effects on fairness preferences of a) monetary versus non-monetary benefits, b) societal context and c) individual characteristics.

Figure 1: Hypothesised factors affecting preferred fairness principles



We explore three hypotheses about how individual moral preferences might be predicted by different types of independent variables (Figure 1). Firstly, addressing the primary research interest of this paper, we propose that conceptions of distributional and procedural fairness are both plural and dynamic (Walzer, 2008) and that the preferred conceptions in a given situation will be shaped by the nature of the benefit, i.e. whether it is monetary or non-monetary. For many of us it is intuitive that we apply different principles of distributional fairness according to the nature of the good being distributed: we might for example think that ‘need’ is the fairest principle for distributing food, ‘equality’ the fairest way to distribute votes and perhaps ‘merit’ as the best way to allocate jobs (Deutsch, 2011). More specific to our hypothesis, there is a body of evidence from experimental psychology that suggests that being primed to think about money induces a distinct normative response (Vohs, 2015).

Whilst our primary interest is in the effect of monetisation, we also expect contexts of place to have an important bearing on social moralities. Our second hypothesis is therefore that

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3 conceptions of fairness will be shaped by the societal context in which the decision is to be
4 taken. Here, we are following literature that suggests that cultural, economic, political and
5 legal contexts are not only shaped by ethical values, but also play a role in shaping the
6 salience of different principles of fairness (Almås et al., 2016, Haidt, 2012, Miller, 2013,
7 Saucier et al., 2015). Thirdly, we propose that individual characteristics and circumstances
8 will similarly shape conceptions of fairness, as some research has found for gender and age
9 (Ruegger and King, 1992), education (Hungerford and Volk, 1990) and economic wealth
10 (Armantier, 2006, Zhang and Yu, 2018).
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16 **Methods**

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18 We compare how monetary and non-monetary benefits from local forests effect judgments
19 about distributional and procedural fairness for villagers in four cultural groups across three
20 countries: i) Monkox indigenous territory in Lomerio, Bolivia, ii) Han villages, China, iii)
21 ethnic minority (Lisu and Dai) villages, China and iv) Tanzanian villages in Kilwa district.
22 We investigate villagers' views about fairness, both in terms of principles for distributing
23 forest benefits, and procedures for deciding this. We survey 519 respondents using a form
24 (Supplementary Information) translated into local language and conducted face to face with
25 in-country research team members.
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28 Faced with the scenario of material benefits arising from community forests, all respondents
29 were asked to rank, in order of preference, a) alternative distributional principles and b)
30 alternative institutional arrangements for decision-making. Distributional principles were
31 based on well-established philosophical approaches to defining fair distribution, including
32 those that argue that fairness is best pursued by prioritising need, equality, utility
33 maximisation or desert (how deserving a person is) (Miller, 1999). Applying these different
34 ethical traditions to the context of forest governance, we generated five alternative
35 distributional principles: 1. Prioritise the poorest ('Pro-poor'), 2. Distribute equally
36 ('Equality'), 3. Invest to generate greatest collective benefit ('Invest'), 4. Prioritise those who
37 experience losses arising from forest conservation ('Compensate'), 5. Reward those who
38 have contributed to forest conservation ('Reward'). Views about procedural fairness were
39 investigated in much the same way, but with four alternative arrangements for decision-
40 making authority: 1. Village leaders, 2. Village assembly, 3. District government and 4. Non-
41 government partner (in China this was private sector forest companies; in Tanzania and
42 Bolivia, non-profit organisations).
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47 Both sets of principles have been adapted from sets that we developed and tested during
48 earlier research in Rwanda, Uganda and Laos (Martin, 2017) and thus we are confident that
49 they are well understood by respondents, that they do not omit any widely preferred
50 principles and that they are appropriate for this new research question about effects of
51 commodification. However, with both sets of statements there are variations of meaning
52 between countries that we acknowledge may have some bearing on comparisons. Firstly, as
53 we will mention in the discussion, the distributional statement for 'Reward' had a somewhat
54 unique interpretation in Bolivia. In all other sites, we found this statement to be understood as
55 referring to those who helped out in the day to day management activities of forests,
56 including guard patrols, boundary marking etc.. In Bolivia it was understood in more
57 strategic, leadership terms, as referring to elders who had fought to secure territorial rights.
58 Secondly, the procedural statement about non-governmental partners was interpreted in
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3 Tanzania and Bolivia as referring to non-government organisations who were supporting
4 local forestry initiatives whereas in Chinese sites there was no such NGO presence and it
5 referred instead to private sector forest contractors.
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8 To test the first hypothesis (the effect of benefit type) we employed two versions of our
9 survey. One version (monetary) defined the benefit as cash income from sale of forest
10 benefits, whilst the other (non-monetary version) defined the benefit to be shared as the forest
11 benefits themselves. In other words, the monetary version imagines that there has been cash
12 payment (e.g. from sale of timber) and asks respondents how that money should be
13 distributed; in contrast, the non-monetary version imagines that forest benefits (e.g.
14 construction materials or fruits) are to be distributed directly. Each site level sample was
15 randomly split so that half the respondents used the monetary version and half the non-
16 monetary version. To test the second hypothesis (the effect of societal contexts) we selected
17 respondents from different locations, across three countries and four cultural groups. To test
18 the third hypothesis (the effect of individual characteristics) we collected basic profile
19 information about respondents (age, gender, education level and wealth). Wealth was
20 measured by proxy, using a simple count of selected durable assets, a method that has been
21 found to adequately correlate with more research intensive measures of income or
22 expenditure (Morris et al., 2000).
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26 Sites were selected in locations where the team already worked and could take advantage of
27 established trust and successful local partnership. They were selected not to be representative
28 of the regions or countries where they are situated, but to provide contextual difference,
29 especially in relation to culture. In all sites, there is some form of community forestry in
30 operation, meaning that communities themselves have some responsibility for local benefit
31 sharing and therefore that local norms of distribution are important. In Tanzania, we selected
32 two villages (Ruhatwe and Kikole) in Kilwa district, an economically poor part of the country
33 with high dependence on natural resources. These villages are seeing a progression towards
34 market exchange for forest goods, through sales of Forest Stewardship Council certified
35 timber under Participatory Forest Management and through carbon offsets generated by a
36 REDD+ pilot project (Corbera et al., 2017). In Bolivia, we worked with communities within
37 the indigenous territory (Territorios Indigena Originario Campesino) of Lomerio, an area of
38 256,000 hectares that has been legally owned by the Monkox people since 2006. As with the
39 Tanzanian sites, there have been moves towards community- and market-based forestry, in
40 this case through Rainforest Alliance 'Smartwood' forest certification and subsequent NGO
41 mediated commercial partnerships between communities and private contractors (McDaniel,
42 2003, De Pourcq et al., 2009, Martin, 2017). Of 29 communities in Lomerio, we selected 4
43 that were currently active in community forest operations (Palmira, Santo Rosario, San
44 Lorenzo and Todos Santos). In China we selected sites representing some of the cultural
45 diversity within Yunnan province. Baojiachun and Xinqi are Han Chinese settlements, the
46 majority ethnic group. Shiba is a village of the Lisu people whilst Manhong is settled by
47 another ethnic minority group, the Dai people. All Chinese sites had experienced some
48 commodification of forest benefits through Payments for Ecosystem Services (the Sloping
49 Land Conversion Programme) as well as more location-specific enterprises such as
50 ecotourism (Baojiachun) and collective commercial forestry (Xinqi).
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56 Sampling strategies differed between countries (Table 1). In Bolivia community sizes were
57 small and we selected one person from each household. In Tanzania we acquired lists of
58 households from the 2012 census and randomly selected 60 households from each village. In
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China we had to use convenience sampling but sought to reduce bias by ensuring different locations in the village were covered and that surveys took place across different days and times.

Table 1. Survey sample

Country	Village	Total population	Survey sample	Qualitative Interview Sample	Participatory Video
Tanzania	Ruhatwe	979	60	12	Yes
	Kikole	1490	60	12	Yes
China	Baojiachun (Han)	5180	60	10	Yes
	Xinqi (Han)	4577	60	10	Yes
	Shiba (Lisu)	1901	60	10	No
	Manhong (Dai)	286	62	10	No
Bolivia	Palmira	391	50	Focus Groups	Yes (collective)
	San Lorenzo	333	50		
	Santa Rosario	82	20		
	Todos Santo	166	40		

Qualitative data collection involved participatory video and semi-structured interviews. Participatory videos (PVs) provided communities the opportunity to highlight local forest justice concerns of particular significance to them, in the absence of any substantial direction from the research team. In essence, this informed us about what really mattered in that time and place, providing a kind of benchmark of what might be prominent in people's minds as they thought about issues of distribution and procedure. The main function of this information was to triangulate with survey findings, helping us to validate and make sense of key findings. PVs were made in Ruhatwe, Kikole, Baojiachun, Xinqi and Lomerio (in Lomerio, the communities collaborated over a shared film). Semi-structured interviews (focus groups in Bolivia) were conducted with a sub-sample of survey respondents and served a similar function, seeking to explain some of the differences recorded between locations and thereby strengthening our confidence in the main findings from the regression analysis.

Survey data was analysed using econometric (regression) analysis to control for the potential confounding effects of many variables such as location, gender, age, education and wealth. We used ordered logits because the dependent variables are ordinal indicators and the tables of regression results report odds ratios. The calculation of standard errors takes clustering at the village level into account.

Results

Factors affecting choices of distributional fairness principle

The three sets of hypotheses outlined above are tested using regression analysis; specifically, ordered logits are used since each of the five distribution principles - pro-poor, equality, invest, compensate and reward – are ranked from the least (1) to the most preferred (5).

These ranks are regressed on indicators of the monetary version, location of sites and individual characteristics of participants (gender, age, education and an index measuring household assets). Table 2 presents the results.

Table 2: Factors affecting distribution principles: Ordered logits (odds ratios)

VARIABLES	(1) Pro-poor (need)	(2) Equality (equality)	(3) Invest (utilitarian)	(4) Compensate (desert 1)	(5) Reward (desert 2)
Dummy variable for monetary version (non-monetary as reference)					
Monetary	0.453*** (0.123)	0.545*** (0.127)	1.317 (0.395)	1.507* (0.357)	2.233*** (0.545)
Dummy variables for location (Bolivia as reference)					
Tanzania	1.308* (0.192)	0.0764*** (0.0219)	4.438*** (1.573)	8.207*** (2.502)	0.582 (0.201)
Han China	1.244* (0.158)	0.589 (0.242)	2.128** (0.750)	5.346*** (1.327)	0.246*** (0.0923)
Lisu and Dai China	0.809 (0.208)	3.494** (1.818)	1.243 (0.812)	7.017*** (3.261)	0.0759*** (0.0351)
Individual characteristics (no education as reference for education variables)					
Male	1.006 (0.243)	0.747* (0.120)	1.308 (0.281)	1.199 (0.280)	0.905 (0.178)
Age (log)	0.780 (0.226)	0.707 (0.195)	1.864* (0.653)	0.581*** (0.114)	1.235 (0.379)
Primary education	1.577 (0.477)	0.649 (0.274)	1.575** (0.293)	0.922 (0.301)	0.823 (0.149)
Secondary education	1.695 (0.573)	0.683 (0.273)	1.408 (0.418)	1.022 (0.371)	0.698 (0.207)
Higher education	2.557*** (0.866)	0.489 (0.223)	1.598* (0.454)	1.496 (1.020)	0.664 (0.212)
Assets count (wealth)	0.848***	0.966	1.188**	0.909*	1.109**
Observations	515	516	517	515	512

Robust standard errors clustered at the village level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The 'monetary' variable shows the odds of selecting a given distributional principle when money is to be distributed against a baseline where 'non-monetary' forest goods are to be distributed. The data show that changes to this variable are significantly correlated with preferred fairness principle. Respondents given the monetary version are less than half as likely to prefer a 'Pro-poor' distribution of benefits compared to those with the non-monetary version (OR = 0.453, $p < 0.01$). Those with the monetary version were similarly less likely to prefer an 'Equality' distributional principle (OR = 0.545, $p < 0.01$). Compared to non-monetary benefits, respondents were more likely to distribute monetary benefits according to one of the desert (deservedness) principles and, in particular, were more than twice as likely to prefer the principle to 'Reward' those who have put in the most effort (OR 2.233, $p < 0.01$). Similarly, there is also rather weak evidence (only at 10% level) that people prefer the other desert principle of 'Compensate' when the monetary version is given (OR = 1.507, $p < 0.10$). It is also interesting to note that 'Invest' is not significantly correlated to the monetary version. We might summarise this as finding that non-monetary benefits composed of forest goods such as construction materials and fruits are more likely to be distributed in a pro-poor

or an egalitarian way whilst monetary benefits are more likely to be distributed according to meritocratic principles. To confirm this effect we ran regressions with interactive terms between location dummies and the variable ‘monetary’ (Supplementary materials). All of the interactive terms for ‘Pro-poor’ and ‘Equality’ are statistically insignificant (only one significant at 10%), showing that the main result is robust across the different study locations.

Turning to our second hypothesis, the odds ratios for location variables (our indicator of societal difference) are expressed against the baseline of our Bolivian location. The results confirm that societal contexts are strongly correlated with preferred conceptions of fairness. Given our deliberate selection of culturally distinct locations, it is not surprising that we see multiple evidence of location-associated moral pluralism. Bolivian Monkox communities are seen to be quite distinct to other locations, with very low preference for the ‘Compensate’ principle compared to all other locations and low preference for the ‘Invest’ principle compared to Tanzania and Han China. Whilst Tanzanian village respondents display a comparatively high likelihood of preferring the ‘Compensate’ principle (OR = 8.207, $p < 0.01$), they are much less likely to prefer ‘Equality’ (OR = 0.0764, $p < 0.01$) and much more likely than Bolivians to prefer the principle to ‘Invest’ to maximise returns (OR = 4.438, $p < 0.01$). Han villagers are comparatively more likely than the Monkox from Bolivia to prefer the ‘Invest’ (OR = 2.128, $p < 0.05$) or ‘Compensate’ principles (OR = 5.346, $p < 0.01$). The ethnic minority Dai and Lisu villages in China reveal a distinctive profile. Compared to the Bolivian reference, these communities favour ‘Equality’ (OR = 3.494, $p < 0.05$) and ‘Compensate’ (OR = 7.017, $p < 0.01$) principles but are unlikely to prefer the ‘Reward’ principle (OR = 0.0759, $p < 0.01$).

When we turn to the individual characteristics of our global data we see that these have a less prominent association with preferred distributional fairness principles. Men are somewhat less likely than women to prefer ‘Equality’ of distribution (OR = 0.747, $p < 0.10$), older people are less likely to prefer the ‘Compensate’ principle (OR = 0.581, $p < 0.01$), those with higher levels of education significantly favour the ‘Pro-poor’ principle compared with those with no school education (OR = 2.557; $p < 0.01$) and those with greater economic assets are slightly less likely to prefer ‘Pro-poor’ distribution (OR = 0.848, $p < 0.01$). These correlations with individual characteristics are smaller and less frequent than those observed for the monetary and location variables.

Factors affecting choices of procedural fairness principles

While the results in the previous section focus on an aspect of distributional fairness, the principles in Table 3 represent one aspect of procedural fairness that is especially pertinent to distribution, regarding where primary decision-making authority resides or, in other words, who decides who gets what. The most striking feature of Table 3 is that there are no significant differences arising from the monetary/non-monetary variable. Thus, a switch from distributing forest benefits directly to distributing money from sales of these benefits, does not appear to be associated with how respondents think decisions should be made. In other words, while commodification of benefits is significantly correlated with preferred distributional fairness principles, it is not correlated with procedural fairness (at least with regard to the specific procedures considered here).

Table 3: Factors affecting procedural principles: Ordered logits (odds ratios)

	(1)	(2)	(3)	(4)
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VARIABLES	Village Leader	Village Assembly	District Government	Non-government partner
Dummy variable for monetary version (non-monetary as reference)				
Monetary	1.307	1.083	0.788	0.787
	(0.375)	(0.260)	(0.297)	(0.241)
Dummy variables for location (Bolivia as reference)				
Tanzania	1.293	0.389*	0.0387***	12.50***
	(0.483)	(0.217)	(0.0223)	(4.380)
Han China	2.839**	0.269**	0.374**	0.0974***
	(1.377)	(0.180)	(0.146)	(0.0284)
Lisu and Dai China	3.189***	0.137***	0.386***	0.318**
	(0.656)	(0.0824)	(0.107)	(0.169)
Individual characteristics (no school education as reference)				
Male	0.824	1.879	0.867	1.445
	(0.327)	(0.822)	(0.211)	(0.349)
Age (log)	1.325	0.582	1.005	0.534
	(0.284)	(0.278)	(0.217)	(0.220)
Primary education	0.959	1.371	0.857	1.081
	(0.393)	(0.382)	(0.242)	(0.234)
Secondary education	0.891	1.606	0.800	1.125
	(0.314)	(0.555)	(0.228)	(0.454)
Higher education	0.663	2.553***	0.958	2.233
	(0.298)	(0.852)	(0.443)	(1.929)
Assets count (wealth)	0.996	1.072	1.046	0.942
	(0.0381)	(0.0496)	(0.0722)	(0.0735)
Observations	512	516	512	514

Robust standard errors clustered at the village level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

By contrast, the location variables again have a robust and almost universal correlation with preferred principle. Lomerio (Bolivia) differs greatly from other locations across all principles. All other locations except Tanzania are significantly more likely to prefer decisions by village/community leaders than in Bolivia; all are significantly less likely to prefer decision making by a village assembly; all are significantly less likely to prefer district government authority; and all except Tanzania are significantly less likely to prefer decisions by a non-government partner. Tanzania is notable for a much higher preference for a non-government decision maker (OR = 12.50, $p < 0.01$). Both Chinese locations show a similar profile of differences to Bolivia, with all more likely to prefer decisions by a village leader and less likely to prefer any of the other principles. Han and ethnic minority (Lisu and Dai) Chinese villages reveal a particularly low likelihood of preferring decision-making by a non-government partner (OR = 0.0974, $p < 0.01$; OR = 0.318, $p < 0.05$).

Again, after controlling for locational and other variables, we see hardly any correlation attributable to individual characteristics. Those with the highest level of education are more likely to prefer collective decision-making through a village assembly (OR = 2.553, $p < 0.01$), but we see no significant correlation with gender, age or wealth.

Discussion

Contemporary theories of human behaviour accept that preferences are not formed by self-interest alone, but also by social morality (Graham et al., 2012) which is itself shaped by contextual circumstances such as culture and institutions (Graham et al., 2012, Haidt, 2013). In Polanyi's analysis of *The Great Transformation*, norms of social responsibility and caring were eroded by the widespread transition from subsistence to market-based exchange (Polanyi, 1944). Recent research in psychology has suggested that disruption to social norms from exposure to monetary exchange can occur much more quickly and locally (Gneezy and Rustichini, 2000, Vohs et al., 2006, Vohs et al., 2008, Gino and Mogilner, 2014), with some studies suggesting that the mere priming of people with the idea of money induces preferences that benefit the rich at the expense of the poor (Caruso et al., 2013, Kouchaki et al., 2013). These research findings provide some cause for concern about the rapid growth in commodification as a putative solution for sustainability, leading us to explore the effects of monetisation, along with locational and individual variables, on local conceptions of fairness.

The most interesting result of our survey is to confirm the hypothesis that a change from non-monetary to monetary benefits from forests is associated with changing preferences for principles of distributional (but not procedural) fairness, a finding that is robust across the different research locations. The results show that when thinking about the fair way to distribute monetary forest revenues, respondents were less likely to prefer 'Pro-poor' or 'Equality' as principles of distribution and more likely to prefer desert-based principles of 'Compensation' and 'Reward'. Does this constitute an erosion of social responsibility, as some previous studies of commodification have found? That would not be a safe conclusion for this study because all of our fairness principles were selected for being reasonable in some contexts at least. However, we do think that a shift away from pro-poor and pro-equality principles for distribution might be contradictory to ambitions to pursue sustainable development. Poverty alleviation and equality are prominent elements of the current global commitment to the SDGs and our findings suggest that the shift to commodification of local forests is likely to induce changes in local moral preferences that could act against these. This association with local fairness principles is especially relevant in the context of community forest governance, in which decision making about benefit-sharing is at least partly devolved to local institutions.

We also confirmed the hypothesis that fairness preferences are associated with locational, contextual factors. This has considerable implications for design of policy and project interventions because distributional and procedural principles considered fair in one place might be considered unjust in another and meet with strong latent or overt resistance. From what we have learned through complementary qualitative research, there are often important local reasons for attributing particular meanings and values to the survey principles. In Tanzanian sites, for example, damage caused by elephants is a huge concern to villagers and we think this contributes to high levels of preference for compensation. In Lomerio, Bolivia, we were surprised that 'Reward' was more favoured than in other sites because this ostensibly meritocratic principle does not seem to resonate with the prevailing communalism of the indigenous Monkox people. Here, however, we found that 'Reward' for those who had helped look after the forests was interpreted as meaning those who had struggled for the Monkox to gain legal rights to their forests. In effect, this refers to the elders and we think

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3 this explains its cultural fit and why it is favoured. In both the Han and Dai villages surveyed
4 in China, there are strong histories of communal forest management in which forest revenues
5 have been successfully used to secure public goods such as roads and schools. It is likely that
6 this historical experience is a key factor in the popularity of an 'Invest' distributional
7 principle. What we are seeing then is that locational associations with distributional fairness
8 preferences can arise from a variety of local material and cultural histories. Such complexity
9 is also seen for procedural fairness. In Bolivia, the comparative dislike for decisions by
10 village leaders alone is almost certainly linked to quite fundamental cultural preference for
11 communalism over individualism. By contrast, the comparatively strong appeal of non-
12 government partner decision-making in Tanzania is likely to be more circumstantial, arising
13 from the presence of a non-governmental organisation (the Mpingo Conservation and
14 Development Initiative) that is highly active in local forest governance initiatives. In the Han
15 Chinese village, the most active non-government partners are private sector forestry
16 companies, again providing a more circumstantial explanation of preferences.
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22 Finally, we were surprised to find so little evidence that individual characteristics such as age
23 and gender are associated with fairness preferences. We do not yet understand the reasons for
24 this but suspect it relates to the specific focus of our study, i.e. that these factors are less
25 important in determining conceptions of fairness related to forest goods and related revenues.
26 Regarding age, it should also be noted that all respondents were adults and we may therefore
27 have missed important differences across adolescence that has been observed in previous
28 experimental studies (Almås et al., 2010).
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