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DRAFT: UNDER REVIEW

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While much is known about transnational climate governance, less is known about transnationalism's contributions to the realization of the United Nations Sustainable Development Goals (SDGs). This paper helps balance the literature via comparative analysis of the potential contributions of two voluntary sustainability certification programs for artisanal and small-scale gold mining (ASGM): Fairtrade International and the Alliance for Responsible Mining. Assessment of four necessary conditions for SDG contributions (goal alignment, rule strength, uptake patterns, indirect effects) suggest weak contributions to date. First, only the weakest versions of standards are being adopted, and only by miners above the poverty line prior to certification. Second, adoption levels are low, and rates of decertification almost as high as certification. Third, awareness raising among consumers and partnerships with public actors are equally weak. Yet programs do align well with the SDGs and have potential. To improve, programs should consider uniting, becoming more 'producer-friendly,' and consider the role within ASGM governance systems they are best-suited to play (which may be none at all). Findings contribute to debates on the merits of increasing governance fragmentation and the role of political consumption in global problem solving. The ASGM case provides lessons about the diffusion of certification to new sectors, with the aim of guiding global resources towards their most efficient and effective ends.

In 2015, the United Nations launched 17 Sustainable Development Goals (SDGs) aiming to enhance the well-being of humans and the environment (UN 2015). Many of the actors working to achieve the SDGs are transnational, meaning they derive authority from civil society or the private sector and operate across national borders. Product certification and labeling programs are one type of transnational actor well-positioned to contribute to the SDGs. These non-state market-driven initiatives write voluntary sustainability standards for global value chain actors and verify compliance via independent audits. Such programs align well with the pursuit of "Responsible Production and Consumption" (SDG 12), and frequently govern additional issues addressed by the SDGs, such as poverty, deforestation, over-fishing, and exposure to hazardous chemicals.

The strongest contributions would come from certification programs with several goals in common with the SDGs, strict sustainability rules with continuous adoption by key actors in important sectors, and positive indirect effects on actors or issues adjacent to program activities. These factors, alone, do not constitute contributions due to the array of implementation problems programs often struggle to solve (Short et al. 2016). But they do serve as necessary conditions for program contributions, and are therefore important factors to study.

Yet research seldom evaluates certification programs in the context of the SDGs. The significance of transnational actors in the pursuit of climate goals is well-established (Andonova et al. 2009; Bulkeley et al. 2012; Hoffmann 2011; Green 2013; Hale 2016), but the generalizability of findings to other types of problems is unclear. And the certification literature has established deep knowledge within the coffee, forestry, and seafood sectors (Auld 2014, Levy et al. 2016), but says less about program prospects in other challenging sectors, such as mining or plastics.

This paper helps balance the literature by assessing the goal alignment, rule strength, adoption patterns, and indirect effects of certification programs governing artisanal and small-scale gold mining (ASGM), a sector which must be reformed for the SDGs to be achieved. ASGM is the subsistence livelihood of 15 million men, women, and children in lower income countries who mine (often informally) using rudimentary techniques that rely on mercury (UNEP

2013). Mercury's chemical properties enable it to attach to gold particles in ground rock, creating a quick and easy albeit poisonous way to mine that larger-scale mining operations have long foregone. Because of this process, ASGM is reported to be the leading source of mercury pollution globally (UNEP 2013), and the livelihood entails a number of other threats to both human and environmental health (e.g. poverty traps, conflict, child labor, deforestation, water contamination, biodiversity loss).

The global governance system for ASGM is comprised of many public and transnational initiatives, such as the United Nations Minamata Convention on Mercury, the U.S. Dodd Frank Act, the Artisanal Gold Council, and Tiffany and Company (Auld et al. 2018; Bloomfield 2017; Haufler 2018; Selin 2014; Author 2015). Approximately 70% of ASGM governors are transnational, yet only two are certification programs targeting the full array of sustainability challenges posed by ASGM: Fairtrade International (FI) and the Alliance for Responsible Mining (ARM). Their rules are therefore the paper's units of analysis.

The paper begins by placing certification programs within debates on the implications of increasing fragmentation in governance systems and the power of political consumption as a governance tool. Next, the paper presents the data used in the analysis: a combination of primary, original data from interviews with program representatives, a database compiled by the author charting uptake trends overtime, and detailed analysis of certification program standards, as well as secondary data from an array of sources. Programs are then compared side-by-side on the factors serving as necessary conditions for strong contributions to the SDGs.

Overall, the paper finds that programs are well-aligned with several SDGs, but three aspects of adoption patterns signal weak contributions. First, only the weakest versions of standards are being adopted, and only by miners above the poverty line prior to certification. Second, there are high rates of *decertification*, with almost as many miners trying programs and quitting as trying programs and sticking with them. Third, awareness raising and partnerships are important to goal attainment, yet only 3% of consumers know about certified gold, and the relationship between programs and public governors of ASGM is similarly weak.

The paper concludes with three changes programs could employ to improve their contributions to the SDGs, but notes that some sectors—such as gold—may be poor institutional fits with certification. The paper thereby provides lessons about the prospects and limits of the diffusion of certification to new sectors, with the aim of guiding global resources towards their most efficient and effective ends.

Transnationalism and the Sustainable Development Goals (SDGs)

As transnationalism increases, governance systems become more fragmented and complex, with debatable impacts on their ability to achieve goals (Biermann et al. 2009; Green and Auld 2017; Schliefer et al. 2018; Zelli and Asselt 2013). Optimists argue fragmentation via transnational actors is helpful because they experiment with new governance approaches, collaborate to offset deficiencies in public actors, and launch “California” effects (i.e. race-to-the-top dynamics) whereby their stronger rules inspire ratcheting up among other governors. Pessimists counter that fragmentation causes coordination problems and race-to-the-bottom dynamics among governors, as well as forum shopping, increased transaction costs, and barriers to trade among the governed.

This mix of opinions is echoed in debates on the ability of certification programs to achieve goals. On the brighter end of the spectrum are cases with mixed to positive impacts. Seafood and forestry certification achieve certain goals in industrialized countries, but largely fail to create change in developing countries or among the worst offenders (Auld et al. 2008;

Barkin and DeSombre 2013). Coffee certification likewise creates *some* good in *some* contexts: higher wages and investments in public goods in Guatemala (Linton 2015), enhanced forest cover in Colombia (Rueda et al. 2015) yet the same or worse wages in Mexico (Jaffe 2014).

Less is known about the darker end of the spectrum, where programs create mixed to negative effects, fail outright, or fail to emerge at all. van der Ven et al. (forthcoming) report that programs aiming to decrease deforestation and increase community access to resources are inadvertently having the opposite effects. Schleifer et al. (2018) find that the diffusion of certification programs to the global South is often not ‘producer-friendly’ (it increases search and compliance costs). Bloomfield and Schleifer (2017) present the case of the Marine Aquarium Council, which failed to gain support from key actors and dissolved shortly after it emerged. And Author (2017) explains why certification programs often fail to emerge altogether, despite the significant sustainability challenges posed by key sectors.

Overall, the literature leans toward a lack of faith in certification’s ability to achieve goals, potentially due to three biases in the research: focus on direct rather than indirect effects, reliance on a non-representative sample of sectors, and lack of focus on ways programs can improve (Green and Auld 2017; Cashore 2016; Bloomfield and Schleifer 2017, Selin and VanDeveer 2007). This paper helps balance the literature by addressing each: it assesses the direct and indirect contributions of ASGM certification (an understudied certification case) to the SDGs, and suggests ways to strengthen them.

Gold Jewelry Certification

The SDGs and certification programs share interest in several issues, e.g. poverty, environmental health, biodiversity and sustainable resource use (UN 2018). While separate streams of research on the SDGs and certification is plentiful, research on their intersection is scarce. Within the certification literature, there is a relative dearth of research on gold and especially ASGM, which causes problems for nearly all of the issues the SDGs aim to address.

Author (2015, 2017) charts the history of certified ASGM’s birth. In 2011, Fairtrade International (FI)—one of the oldest certification programs in existence—introduced gold as their 19th certified product after encountering the work of the Alliance for Responsible Mining (ARM), a transnational non-governmental organization working specifically to reform ASGM such that it might be suitable to sustainability certification. In 2009, the two organizations partnered to create “Fairtrade and Fairmined Gold,” a certification program using the same sustainability standards, auditing and labeling systems as other commodities, but adapted slightly to suit the particularities of ASGM. The program launched in 2011 but disbanded in 2013 due to differences in the organizations’ beliefs about the most strategic ways forward, especially with regard to issues like social premium payments to miners and the sourcing models offered to retailers (Author 2015, Fisher 2017).

The first wave of research on certified ASGM was doubtful to tepid on its prospects for creating meaningful change in the sector. One concern was that programs would not reach the miners most in need of development assistance (Childs 2010, 2014; Hilson et al. 2016). Instead, certification programs might aim for “low-hanging fruit” (Hilson et al. 2016), defined as mining cooperatives already operating legally and earning decent incomes. Further, Hilson (2008) warned that in some contexts the final buyer of ASGM gold is national governments, not foreign jewelry consumers, presenting a mismatch between program aims and reality. Childs (2014) warned that cooperatives might resist certification due to the history of failed development interventions in many mining communities and miners’ reliance on informal trading networks for

a range of services. Additionally, Author (2015) and Hilson et al. (2016) worried about the ability of ASGM cooperatives to obtain legal permits to mine given national government preferences to cater to large-scale mining's needs and the scarcity of gold-laden land. Focusing on mercury, Childs (2010) warned about the potential for "mismatches" between miners' and certifiers' views of what responsible mercury use means. Finally, Fisher (2017) presents a mixed view of the joint-program's certification attempts in East Africa. While the sharing of best practices between programs and mining communities occurred, only one of the cooperatives studied achieved certification by 2015, and it lost it in 2016 because their mine collapsed.

While this literature is helpful, it mainly focuses on the now-defunct joint program, and generally lacks a global perspective, attention to mercury, and ideas for program improvement. As with the broader certification literature, this paper provides a corrective via a global comparison of current program performance on a range of SDG issues, including mercury.

Data and Analysis

Case selection for the paper was straightforward. The International Trade Center's Voluntary Sustainability Standards database identify fourteen programs currently governing gold.¹ Of these, ARM and FI are the only initiatives governing the full array of social, economic and environmental concerns posed by ASGM and are therefore the paper's sample.

To estimate the strength of their contributions to the SDGs, the paper assesses four necessary conditions for contributions: goal alignment, rule strength, uptake patterns and indirect pathways of influence.² Goal alignment is how well and how many program goals match the SDGs. Rule strength is the amount of behavior change required of problematic actors, and how close the resulting change comes to ameliorating the problem it targets. Uptake patterns are market responses to the program: whether the worst offenders or those most in need of help are being reached, whether the strongest or weakest versions of rules are being adopted, what percentage of producers, production and sales are certified, and whether uptake is increasing, decreasing or stagnating. These first three factors proxy for direct effects, but indirect effects on other issues or actors not actively part of programs matter, too. Awareness raising among consumers about the challenges posed by ASGM may raise constituencies for change via other governance methods. Or programs might help public governance efforts by redefining problems, test-driving solutions, or assisting with capacity building and policy implementation (Cashore 2016, Green and Auld 2017).

ASGM programs making the strongest contributions to the SDGs would have several goals in common with the SDGs, strong rules with widespread and increasing uptake among the poorest and most environmentally harmful miners, and helpful indirect effects on miners, consumers, and governments. Of course, perfect contributions are seldom reached by voluntary programs due to the known trade-offs between strong rules and widespread adoption by key actors: little change is created by strong rules adopted by few *or* weak rules adopted by many. Yet the potential for strong and moderate contributions exists, and its likelihood can be assessed through measurement of these factors.

Measurement is based on data from several sources. First is the program standards themselves, published by ARM and FI, which inform measures of goal alignment and rule

¹ A fifteenth will likely be the Initiative for Responsible Mining Assurance (IRMA), but it is not active as of May 2018.

² Actual contributions require analysis of program compliance and on-the-ground changes, data for which is not available at the time of writing. Following Mahoney (2012), the paper focuses on necessary conditions as a second-best method. If conditions are present, then contributions *might* be strong. If conditions are *not* present, then contributions *are* weak.

strength. Second, the author collated program documents listing the certification status of artisanal and small-scale mining organizations (ASMOs) and consulted program databases housing this information from 2013-2017 (five years). The author's resulting database of certification trends (i.e. certifications and decertifications) is unique and important because ASMO status is overridden yearly, making historical data unavailable to the public. Confirmation of this data's accuracy and supporting details (e.g. numbers of miners in ASMOs, yearly certified sales) were procured through email exchanges with program representatives. Skype and in-person interviews with program and jewelry industry representatives were used to gather data on the dispersal of income among value chain actors. Social premium expenditures were gleaned from program websites; adoption levels in other sectors are from interviews with academic experts; program impact on consumers' and miners' knowledge was gathered from secondary sources (published surveys and academic articles); and assessments of interactions between program representatives and public governance figures are informed by the author's observations at an international negotiating meeting for the United Nations Minamata Convention on Mercury in Uruguay, 2012, and recent academic publications (e.g. Sun 2017).

Results

Because of their shared pasts, ARM's and FI's programs share many similarities. Their program purposes are nearly identical: both aim to "create opportunities" for ASMOs by "promoting formalization," "improving working conditions", fostering "gender equality," "improving environmental management," "reducing poverty," "eliminating child labor," and strengthening ASMOs' "capacity" to advocate for "legislation and public policies" (ARM 2014 p.4, FI 2013 p.4). Both programs' rules are progressive (get stronger over time), and both organizations consulted with miners when writing them.³ FI aims to disrupt capitalism more than ARM, working to "change conventional trading systems" whereas ARM aims to create ethically "viable businesses". But overall, both programs address 10 out of the 17 SDGs (See Table 1), making them highly aligned with the SDGs. Their rule strength, uptake patterns, and indirect effects shape the remainder of their contribution strength.

Rule Strength

Beyond "Responsible Production and Consumption" (SDG 12, which program rules as a whole support), ASGM certifications align with 9 additional SDGs. The first two—Decent Work and Economic Growth (SDG 8) and Gender Equality (SDG 5)—designate who can become a certified miner. Instead of promoting criminalization of ASGM in country contexts where alternative employment is scarce, programs support giving miners jobs by drawing them out of the informal economy, organizing them into legally-permitted ASMOs, and banning gender discrimination in the hiring process. Programs further address child labor, a focus of the "decent work" SDG. Children frequently mine to help families earn income, staying home from school and incurring permanent injury from mercury and other hazards (UNEP 2013). Both programs allow children ages 0-7 to work alongside family members due to scarcity of child-care programs, but ARM bans children age 7-14 from mines, whereas FI allows them to work. ARM's approach protects children from mining hazards, but also lowers family income, which is needed to pay school fees and invest in mercury-free technology. In the short-term, ARM may be

³ Details on differences in organizations' governance and decision-making bodies is in a separate working paper by the author on Southern responses to certification and explains rule and program formation.

stronger on child protection, but the long-term sustainability impacts depend on analysts' beliefs about the relationship between health, income, and pro-environment behavior.

The "Peace" and "Life on Land" SDGs (16 and 15) align with program goals that designate where certified mining can take place. Both ARM and FI ban ASGM in areas of known civil conflict and potential conflict with agriculturalists, but FI goes further by additionally banning ASGM on land near indigenous communities and large-scale mining operations, where violence often occurs as well (Author 2015). FI's rules are therefore stronger on peace. They are also stronger at safeguarding protected areas and critical ecosystems, a major focus of the "Life on Land" SDG, because they require more of ASMOs seeking an exception to this rule. Such ASMOs must conduct environmental impact assessments and gain third-party verification that their mining operations will be environmentally benign. ARM requires neither, instead prioritizing livelihood generation, allowing exceptions to mine in sensitive habitats if no alternative livelihoods are available nearby. While the offering of exceptions weakens both programs' rules on these goals, the increased mining that results may enhance contributions to other goals, e.g. poverty reduction.

In addition to governing *where* mining can occur, programs further align with the "Life on Land" goal by governing *how* it can occur, connecting program goals to SDGs promoting "Clean Water" (SDG 6) and "Good Health" (SDG 3). Both programs offer two versions of their standards that miners can choose to certify under: an weaker 'basic' standard, and a stronger "Ecological" standard. Waterways are protected in all standards: upon entering programs, miners must stop dumping fuel and contaminated water into or near them. And after three years, miners are further required to end acid mine drainage, a process in which exposed rocks create toxic chemical compounds that seep into drinking water. ARM's water rules are stronger than FI's, however, because they additionally address water turbidity (the clouding of water with dirt). Programs also require restoration and rehabilitation of mined areas through re-vegetation after three (ARM) or six (FI) years in the program (both require it earlier in their Ecological standards, with ARM requiring it earlier than FI). Both programs are equally bad at addressing deforestation (often a central component of mining), protecting wildlife (endangered species are often hunted by miners for food and harmed by forest degradation and chemicals), and preventing malaria (open pools of water breed mosquitos), since there are no rules on these issues. Taken together, these omissions and delays in environmental care, along with the inherent tensions between sustainability and non-renewable resources like gold, makes program rules only moderate protectors of "Clean Water" and "Life on Land," at best.

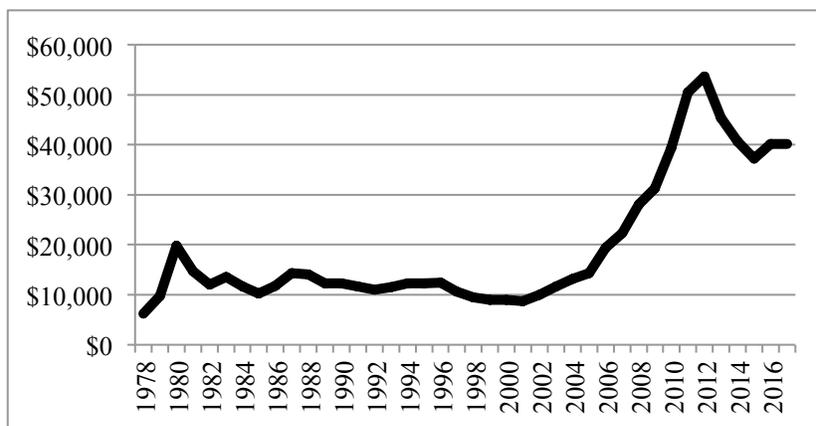
The goal of "Good Health" (SDG 3) is further addressed via rules on toxic chemicals, specifically cyanide and mercury. In addition to detoxifying cyanide before discharging it, miners cannot mix it with mercury amalgam as an entry requirement for FI, while ARM allows this until Year 3, making its rule significantly weaker on health since cyanide heightens mercury's harm (UNEP 2013). With regard to all other uses of mercury, program requirements are identical: miners must use a mercury-reducing technology called a retort under basic standards, or adopt mercury-free technologies such as gravity, magnetic, or flotation concentrators and smelting crucibles under the ecological standards (EPA 2018).

While retorts reduce mercury by 75-95% if used perfectly, they are frequently used imperfectly (worse for health than non-use because vapor is concentrated) (AGC 2018), and keep demand for mercury alive when the Minamata Convention seeks to reduce or eliminate it (Selin 2014). Requiring retorts is therefore a moderately strong rule at best. Analysts favoring more radical and complete solutions to the mercury problem, and doubting the relationship between

growing wealth and growing environmental protection that motivates the basic standards, will view only the ecological standards as strong rules.

ARM and FI do differ on one important aspect of their mercury rules: the incentives provided for basic and ecological standard adoption. These rewards for better behavior not only support the environment and health SDGs, but contribute directly to “No Poverty” and “Reduced Inequality” (SDGs 1 and 10). Programs offer miners two types of financial rewards: wages paid directly to individual miners to be used at their discretion, and social premiums paid to a bank account to be used to benefit the mining community in ways determined by ASMO vote. Both programs pay miners the same wage: 95% of the London Bouillon Market Association price (LBMA) compared to the 70% often fetched in un-certified markets (constituting a 36% wage increase). The programs differ in the premiums they pay. For miners certifying under basic standards, ARM pays twice as much as FI: \$4,000/kg compared to \$2,000/kg. For miners certifying under ecological standards, relative reward strength depends on the gold price: ARM pays \$6,000/kg whereas FI pays 15% of the gold price. Ecological premiums are equal when the gold price \$40,000/kg: ARM pays more when the price is below; FI pays more when it is above. In 2001, the gold price began a steady climb to record heights in 2011, and has hovered around an average of \$40,664 since the financial crisis in 2008.⁴ 2011-2017, FI’s incentives for mercury reduction have been higher in all years except 2015. It is tempting to conclude that their rules are therefore stronger on mercury, but it is more accurate to say that rule strength depends on whether the gold price will rise or fall, and whether the analyst prefers many small reductions in mercury or a few bigger ones.

Figure 1: Gold Prices Over Last 40 Years, USD/Kg



Data: World Gold Council

In addition to payments, some certification programs offer cost-sharing mechanisms to help miners more easily afford cleaner technologies and certification fees (Schliefer et al. 2018). Unfortunately, neither ARM nor FI provide these, which weakens program rules on poverty.

A final way programs work to reduce poverty is by driving as much business as possible to the ASMOs via three trading models tailored to different retailers’ needs. In addition to fully traceable and labeled gold, both programs have semi-traceable “mass-balancing” models that track gold from the mine to the refinery, but no further. Gold sourced through these models is mixed with uncertified gold, does not bear program labels, is less expensive and available in

⁴ Gold prices tend to rise in periods of financial market uncertainty, such as after the September 11th, 2001 terrorist attacks and after the 2008 financial crisis.

larger volumes. FI offers a second semi-traceable model (its third model, total) that is identical to their mass-balancing model except it aims to attract small-scale jewelry makers and retailers by waiving the prior model’s licensing fees. ARM likewise differentiates itself via its third model, which aims to attract donations from actors who would otherwise forego adoption due to concerns such as branding, industry position, or non-membership in the gold industry. This model completely separates the donation from gold sourcing. FI does not have an equivalent model, believing it departs too far from their ‘trade, not aid’ values and allows harmful industry sourcing practices to continue (author’s interview). While such ‘greenwashing’ may occur, so might flows of income to miners that might otherwise be missed. As with rules on mercury, the strength of trading models is somewhat subjective.

Table 1: Comparison of Program Rules with SDGs		Alliance for Responsible Mining (ARM): Fairmined Gold	Fairtrade International (FI): Fairtrade Gold	
Sustainable Development Goals	Certification Program Goals	Program Requirements		
Responsible Consumption and Production	Decent Work and Economic Growth	Formalization	Acquire legal permits	Acquire legal permits
		Child Labor	Bans children 7-14, but fewer programs	Allows children 7-14, but more programs
	Gender Equality	Gender Equality	Non-discrimination in hiring	Non-discrimination in hiring
	Peace	Reduce Conflict	Bans fewer conflict types	Bans more conflict types
	Life on Land	Ecological Restoration	Revegetate	Revegetate
		Critical Ecosystems	No impact assessment, no third parties; focus on livelihoods; Nothing on poaching	Requires impact assessment, involves third parties, focus on environmental effects; Nothing on poaching
	Clean Water	Water Management	Turbidity caps	None.
	Health	Toxic Substances	Amalgam cyanide leaching banned Year 3; retorts (Basic) or mercury-free technology (Ecological).	Amalgam leaching banned Year 0; retorts (Basic) or mercury-free technology (Ecological).
	No Poverty and Reduced Inequalities	Development	Cash: 95% gold price Account: \$4,000 (Basic) Account: \$6,000 (Ecological) Cost-sharing: None	Cash: 95% gold price Account: \$2,000 (Basic) Account: 15% (Ecological) Cost-sharing: None
		Commercial Uptake	Fully-traceable: Fairmined Labeled	Fully traceable: Fairtrade Labeled
			Semi-traceable: Fairmined Incorporated	Semi traceable: Fairtrade Sourcing and Registered Goldsmiths
		Not traceable: Fairmined Certificates		
	Partnerships	None	None	None

In summary, program rules are well-aligned with and strong to moderate on the SDGs. ARM’s rules are stronger on Poverty, Life on Land, Clean Water, and the child labor aspect of Decent Work, while FI’s are stronger on Peace and (arguably) Health. The remaining factors shaping contributions—uptake patterns and indirect effects—are discussed next.

Uptake Patterns

Four types of uptake patterns are assessed to estimate program contributions: uptake levels (e.g. market share), dominant standard type (basic or ecological), dominant target type (e.g. those most in need of help or reform), and uptake trends (whether certifications are increasing, decreasing or stagnating). To date, the patterns unfortunately indicate weak contributions to the SDGs.

After 5 years of competing programs, there are 10 certified ASMOs (7 with ARM, 3 with FI) in 6 countries across 3 continents, constituting 0.01% of artisanal miners and 0.04% of artisanal gold sales (See Table 2). Comparisons with other sectors are imperfect but suggestive. Looking only at FI certifications, wine, for example, gained 30 certified producer groups in 15 years, an average of 10 per 5 years compared to gold’s 3 per 5 years. Coffee gained around 450 certifications in 30 years, an average of 75 per 5 years. While uptake is likely exponential, gold’s current levels seem low. The number of stores selling certified gold is nearly even across programs: 136 stores for ARM, 137 stores for FI. But differences emerge regionally. ARM is dominant in the US, Latin America, Asia and South Asia, with 59 stores to FI’s 3. FI is dominant in Europe, with 130 stores (led by 90 in the UK) to ARM’s 76.

Among certified ASMOs, the basic standard is dominating: only 1 out of 10 ASMOs holds an ecological certification. This significantly reduces programs’ contributions to both health and poverty related SDGs. As discussed in the rule section, the basic standard’s reliance on retorts means the demand for mercury stays alive and that harm can continue via malfunctions, despite certification uptake and compliance. It further means miners are fetching lower rewards than they would under ecological certifications (although these might be efficient, profit maximizing choices depending on miners’ financial circumstances).

Licensees Selling Certified Jewelry, 2017			Certified Mining Groups, 2017		
	ARM	FI		ARM	FI
Australia	1	4	Bolivia	1	
Europe	76	130	Colombia	3	
Latin America	11	0	Peru	2	1
East Asia	4	1	Uganda	0	1
India	1	0	Kenya	0	1
North America	43	2	Mongolia	1	
				Total: 10 ASMOs	
Globally	136	137	Basic	6	3

Regarding targets, certification does not appear to be reaching the poorest miners, which empirically supports theoretical worries in the literature. The average uncertified artisanal miner produces 0.02 kg/year of gold, equivalent to \$1.83 per day, placing them in extreme poverty according to World Bank definitions. However, certified miners sold roughly 0.11 kg/year (ARM) or 0.30 kg/year (FI), amounts equivalent to roughly \$15/day *without* certification, which

is well above the \$3.10/day poverty line. While certification may mildly boost production efficiency and market access, it cannot account for an increase of this scale. Miners were likely selling close to these amounts before certification, and therefore were not in poverty to begin with. Further, even if programs *did* reach the average miner, certification under the basic standard would boost incomes from \$1.83/day to \$2.48/day, or up to \$2.75/day (ARM) if social premiums are included: a move from extreme poverty to moderate poverty, but not above the \$3.10/day poverty line. So while program rewards are helping to reduce inequality (since these yearly incomes are still very low), they are not reducing poverty, their stated goal and a key SDG.

Further, this uptake data throws doubt on the assumption that mercury use is poverty-driven: certification is attracting miners who are not in poverty yet still use mercury, and these miners are choosing to certify under standards that allow them to continue using it. One possible explanation for the lack of poverty but presence of mercury might be that miners need more time in programs to accumulate enough wealth to feel safe investing in mercury-elimination. Unfortunately the data to date do not support this. Social premiums have helped communities accumulate wealth, generating \$1.2 million for miners under FI and \$1.7 million under ARM 2013-2017. But to date only one ASMO has made mercury-free investments—Colombian cooperative Iquira voted to invest 60% of its premiums in mercury-eliminating processing plants (ARM 2017). The remaining eight ASMOs invest differently. Peruvian miners use premiums for environment and development (e.g. water treatment plants, educational facilities, audit payments) as well as enhancing well-being (e.g. a vehicle to drive miners to and from work, and two sports fields). Colombian miners similarly bought safety equipment, micro-loans, and a computer. These investments enhance morale, capacity and productivity, but higher incomes are not leading to mercury reductions and the associated goal of improved health.

The final uptake pattern studied is whether certification is consistently spreading among ASMOs and stores. The good news: store participation is growing fairly steadily.⁵ Over the last two years, ARM gained stores in Austria, France, Germany, Spain and the UK, as well as in Belgium and Denmark, two markets in which FI *lost* its existing stores during the same period. But FI did have gains as well, emerging as the first and sole seller in Ireland, Luxembourg, and Finland. Overall, 2016-2017, ARM gained 22 stores and lost 3, while FI gained 80 and lost 7, which are 14% and 9% loss rates, respectively.

The bad news is that miners are more ambivalent about program merits. 2014-2017, almost as many ASMOs have tried certification and quit (9 ASMOs) as have tried certification and stuck with it (10 ASMOs). 4 ASMOs withdrew from both programs, and one switched from certifying with both to only certifying with ARM. Overall, ARM has gained more certifications than it has lost (7 to 4), whereas FI has *lost* more than it has gained (5 to 3). ARM's decertification rate is 36% compared to FI's which is 63%. However, if ASMOs who have tried to certify and failed are included (many in East Africa have been struggling since 2014), then both organizations have lost more than they have gained. For comparison, scholars estimate that coffee decertification rates are about 40% (author's interviews). But any amount of decertification is troubling given the high financial and intellectual start-up costs producers, especially miners, must overcome to certify.

Trends are no better if only ecological certifications are studied. Colombian ASMO "Oro Verde" was the first ASMO to gain ecological certification (certifying under the joint program in 2011). But circa 2013, large-scale gold mining companies offered Oro Verde more money for

⁵ Data is on adoption via all three of FI's trading models and the first two of ARM's models, because ARM's third model is not comparable.

their land than they were getting through certification, so they sold and decertified circa 2014 (author's interviews). 2014-2017, three ASMOs became ecologically certified, but as of late 2017, only the Mongolian ASMO is *still* certified (and by ARM). Both of the ecological decertifiers are from Colombia: one was certified by both ARM and FI and quit both programs, whereas the other (particularly large) ASMO was certified by ARM and downgraded to their basic standard. FI is continuing to support ecological certification attempts in Uganda, but no ASMOs are certified to date.

Indirect Influences

While initial optimism about well-aligned goals and moderately strong rules is now tempered by troubling uptake patterns, programs might still contribute to the SDGs indirectly by spreading knowledge or effecting other actors. In the ASGM case, Fisher (2017) reports that news about best mining practices is spreading from certified to uncertified mining organizations. Yet both she and the author's interviews (2015) corroborate the concerns raised by Childs (2014): mining communities are *also* learning that certification is likely not worth the hassle and are slow to trust certification program representatives due to negative experiences with such interveners in the past.

Neither positive nor negative knowledge about programs and issues seems to be spreading among consumers. In a survey of FI customers, only 3% were aware that certified gold existed, compared to about 50% for certified chocolate, and 64% for certified coffee and tea (Ingle and Rhodes 2016). Of course, coffee certification has existed for nearly 30 years compared to gold's 7 years. Still, it does not appear at this time that gold certification is contributing to the SDGs by raising a constituency for better gold governance.

Finally, private and civil society actors frequently shape the design and implementation of global public policies. Sun (2017) details the role of several transnational actors in shaping the text of the UN Minamata Convention on Mercury, which governs ASGM. Yet certification programs are not mentioned in his analysis, and this paper's author also observed their reserved behavior at the treaty's negotiating sessions relative to other transnational actors. This suggests that they are not having indirect influence on the SDGs by working through public actors, either, although it remains possible that public governors are watching gold certification programs and learning lessons from them informally.

Conclusion

Overall, ARM and FI are best understood as having different strategies for reforming ASGM and contributing to the SDGs. ARM strives to attract miners with its high-paying basic standard, trusting that consumers are willing to pay the higher price, and that development will lead to ecological upgrades among miners. FI believes consumers are more price sensitive, so keeps their rewards for basic standards low, and gives miners big financial rewards to formally incentivize upgrades.

To date, ARM's strategy is attracting more miners than FI's (7 ASMOs to 3), but levels of certification in both programs are low and somewhat stagnant. Programs are reaching only the higher-income miners who are opting for the weakest standards available, while foregoing investing in mercury-free technology. Indirect program influences are equally lackluster.

Therefore the necessary conditions for strong SDG contributions are not present: programs are likely weak contributors to the SDGs, despite their moderate to strong rules on issues well-aligned with them. In light of these findings, the paper concludes by discussing three changes programs could make to improve, as well as associated paths for future research that would leverage and complement lessons from the ASGM certification case.

First, ARM and FI should reunite to form a single certification program. Consumers already face an overwhelming number labels, and educating them about the need for certified gold will be hard enough without adding competing programs to the mix. Further, the intuition modeled informally in Table 3 and formally in Author (2016) shows that program competition could inadvertently harm mercury reduction efforts. If programs compete in the same mining community, ARM’s basic standard (offering medium-reward for low-effort) will likely lure some medium-capacity miners away from FI’s ecological reward (offering slightly higher reward for *much more* effort). Yet under a FI monopoly, when the only basic standard pays relatively little, these same miners would likely choose ecological standards and go mercury-free. Finally, reunification is feasible since the mass-balancing issue that once divided programs is resolved, and a reduction in the number of governors would please those arguing that fragmentation in global governance systems is undesirable. Future research could contribute to the fragmentation debate by formally modeling the negative impacts of program competition, asking miners what drives their choice of programs, and identifying any barriers to reunification within programs and which theories of conflict resolution might help to overcome them.

Table 3: Adverse Impacts of Competition on Mercury Reduction	ARM	FI
Basic	Medium reward, low effort	Low reward, low effort
Ecological	Low reward, high effort	High reward, high effort

Second, programs should make themselves more attractive to miners to increase uptake levels and lower decertification rates. Giving miners higher financial rewards might help. Currently, 15% of the price of a certified wedding ring goes to the miner while 60% goes to the retailer (Author 2015b). While retailers have high expenses such as rent and advertising, creative changes such as becoming a benefit corporation to reduce taxes, moving stores online, and improving customer education to fetch higher prices could shift more money to miners with minimal changes to margins. Of course, findings from this case suggest that more money may not lead to better behavior, and behavioral economic theory warns that financial rewards can backfire by “crowding out” intrinsic motivations for change (Gneezy and Rustichini 2000). So non-monetary program improvements should be explored, too.

Academics can support efforts to enhance program attractiveness by conducting field research on miners’ certification experiences and preferences, providing the literatures on environmental politics and certification with important and often missing accounts of Southern voices and agency. Such research should also explore what might make mercury-free livelihoods more attractive, since they are central to many sustainability goals. Changes might include altering the reward differentials between basic and ecological certifications; requiring that some social premium be spent on mercury-free investments; launching cost-sharing programs, or partnerships with makers of mercury-free technology (e.g. firms, universities); and offering education on non-mining livelihoods.

Consumers are a piece of the puzzle, too. Author (2017) identified six market attributes that make products more likely to become certified: political neutrality, industrial concentration,

predictable supply, issue linkage, strong activists, and *non-luxury status*. The last finding is clearly a problem for gold jewelry certification. While it is known that consumers are willing to pay more for lower-priced items like certified coffee (Hainmueller et al. 2015), it is an open question how high up the price ladder pro-social behavior persists. Not only did interviews reveal that consumers complained about the high price of certified jewelry under the joint-program (prices for a typical wedding ring rose from roughly \$558 to \$754, nearly \$200), but a growing stream of research suggests that an “attitude-behavior gap” exists for luxury consumption such that pro-social desires (e.g. ethically sourced materials) are over-ridden by self-serving desires (e.g. aesthetics) (Davies et al 2012; Janssen et al 2014; Moraes et al 2012). Future research should test these theories more rigorously and with an eye toward solutions that could be applied to gold jewelry and other problematic luxury sector cases (e.g. furs, wine, diamonds,⁶ illicit goods⁷).

The third and final suggestion is for scholars and practitioners to consider which position within governance systems gold certification should occupy. Programs may become dominant governors, weak but wide governors, strong but niche governors, members of public-private partnerships, or they might dissolve to become non-members of systems (Auld et al. 2009). The presence of the Minamata Convention means a dominant position is unlikely. Success as a weak but wide governor is unlikely too, since programs could relax certain rules (e.g. paperwork requirements) to increase uptake, but weakening others (e.g. mercury requirements) would render programs illegitimate. More likely is success as a strong but niche governor: programs would only offer ecological certification, and certified miners would serve as living proof that best practices are possible. Success could come via partnership with parties to the Minamata Convention or states aggressively working to achieve the SDGs, since public-private partnerships have a track record of success in many governance systems (Sun 2017, Andonova 2017).

It is also possible that the most efficient, equitable and effective change programs could make is to not govern at all. Programs likely fail or fail to emerge for good reasons. It is revealing that of the six desirable sector attributes identified in Author (2017), marine aquarium fish had zero and certification failed, and gold jewelry has only one and certification is struggling. Rather than artificially propping up struggling programs or working very hard to change them, the international community’s time, energy and finances might be better invested in alternative governance approaches.

These changes might strengthen ASGM certification program contributions to the SDGs by decreasing fragmentation in governance systems, giving more weight to environmental health issues and Southern agency, and encouraging identification of the wisest program positions within governance systems. Yet research on the institutional fit of certification with specific sectors and issues is just beginning, and the gold case highlights many of the struggles certification will face as it diffuses across product sectors and governance goals. In time, as more cases such as this one that reach beyond agriculture, forestry and fisheries certification accrue, the conditions under which certification programs not only survive but thrive, and the types of goals they are best suited for achieving, will be ascertained, to the benefit of the environment and international community. With wise evolution and discerning deployment in promising sectors, certification can be an important component of a suite of governance approaches that foster sustainable development.

⁶ While consumers responded to ‘blood diamonds,’ the Kimberley Process is not a third-party certification program, and its success is debated (Smillie 2014).

⁷ See Bennett (2017) for important work on cannabis certification.

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