

Working Paper Sustainability and Innovation
No. S 9/2014



Miriam Bodenheimer

Certifying Improvement, Improving
Certification: An Analysis based on the
Artisanal and Small-Scale Mining Sector

Abstract

There are a plethora of voluntary initiatives indirectly connected to artisanal and small-scale mining (ASM), but until recently, none of these standards were explicitly concerned with ASM. It is only with the introduction of certification schemes specific to the ASM sector that guidelines are being designed and implemented that expressly address its unique dynamics. But implementing certification schemes remains costly and it is therefore important to analyze in detail to what degree problems within the ASM sector can be addressed through these mechanisms before making more of those investments. Consequently, this paper aims to perform such an evaluation through a two-pronged approach consisting of a theory-based analysis of the working mechanisms of certification and a review of qualitative data from interviews with key players in the field of ASM certification. The results show that there are still a number of problems in how small-scale mines are being certified, but that, at the same time, the approach has the potential to make significant contributions to development and poverty-reduction in the sector. The paper concludes with recommendations based on these findings.

Table of Contents

1	Introduction	1
1.1	Background and Relevance	1
1.2	Objectives and Research Questions.....	4
1.3	Organization.....	5
2	Current State of Research	7
2.1	Artisanal and Small-Scale Mining	7
2.2	Certification	10
3	Methodology	13
3.1	Analysis of Literature.....	13
3.2	Expert Interviews	13
4	Problems in the ASM Sector	15
4.1	Political and Legal Issues.....	15
4.2	Economic Issues.....	17
4.3	Health Issues	18
4.3.1	Miners' Health and Safety	18
4.3.2	Community Health and Social Issues.....	21
4.4	Environmental Issues.....	22
4.5	Armed Conflict	24
4.6	Summary.....	24
5	Certification	27
5.1	Types and Definitions of ASM Certifications	27
5.2	Overview of Current ASM Certification Schemes.....	30

5.2.1	ARM/FLO Fairtrade and Fairmined (FT/FM) Standard for Gold from Artisanal and Small-scale Mining (ASM), including Associated Precious Metals	31
5.2.2	BGR CTC and ICGLR RCM	33
5.2.3	Brief Overview of Other Standards and Laws	35
5.3	Summary.....	37
6	Theory.....	39
6.1	Private Governance Theory	39
6.2	New Institutional Economics	41
6.2.1	Property Rights Theory	42
6.2.2	Principal-Agent Theory.....	44
6.2.3	Transaction Cost Theory.....	48
6.3	Hypotheses	52
7	Evaluation of Hypotheses based on Interview Results	57
7.1	Summary of Interview Results.....	57
7.1.1	Merits of Certification.....	57
7.1.2	Challenges and Difficulties for Small-Scale Miners	59
7.1.3	Institutional Prerequisites for Success.....	62
7.1.4	Appropriateness of Certification Requirements	64
7.1.5	Is certification an effective approach to development and/or poverty-reduction?	66
7.2	Theory-based Evaluation of Current Status	67
7.2.1	Private Governance Theory	67
7.2.2	Property Rights Theory	70
7.2.3	Principal-Agent Theory.....	70
7.2.4	Transaction Cost Theory	72
7.3	Evaluation of hypotheses	73
8	Recommendations.....	79

9 Bibliography.....83

Annex 1: ASM Problems by Category90

List of Tables

Table 1:	List of expert interviews conducted	14
Table 2:	Common environmental impacts resulting from small-scale mining activity	23
Table 3:	Conceptualizing key terms in the 'Conflict Minerals' discourse	29
Table 4:	List of selected ASM certification standards	31
Table 5:	Resolution of principal-agent problems through certification	47
Table 6:	Attributes of the Contracting Process	49

List of Figures

Figure 1:	Distribution of artisanal and small-scale mining in the world.....	1
Figure 2:	Number of publications by year that include "artisanal and small-scale" AND (mining OR ASM)' in the full text of the article as listed in various scholarly databases on 18 October 2012	8
Figure 3:	Simple Contracting Schema	50
Figure 4:	Transposition of Williamson's Simple Contracting Schema onto an XY-Graph	51
Figure 5:	Roster showing relationship between hypotheses and theoretical foundations	54

List of Abbreviations

3Ts: tin, tantalum and tungsten

ARM: Alliance for Responsible Mining

ASGM: artisanal and small-scale gold mining

ASM: artisanal and small-scale mining

BGR: Bundesanstalt für Geowissenschaften und Rohstoffe

BICC: Bonn International Center for Conversion

BMWi: Bundesministerium für Wirtschaft und Technologie

CTC: Certified Trading Chains

DDG: Due Diligence Guidance

DRC: Democratic Republic of the Congo

FFMP: Fairtrade and Fairmined Minimum Price

FLO: Fairtrade Labelling Organization

FT Premium: Fairtrade and Fairmined Premium

ICGLR: International Conference on the Great Lakes Region

ILO: International Labour Organization

ITRI: International Tin Research Institute

iTSCi: ITRI Tin Supply Chain Initiative

LBMA: London Bullion Market Association

LSM: large-scale mining

ODA: official development assistance

OECD: Organization for Economic Cooperation and Development

RCM: Regional Certification Mechanism

RJC: Responsible Jewelry Council

SEC: U.S. Securities and Exchange Commission

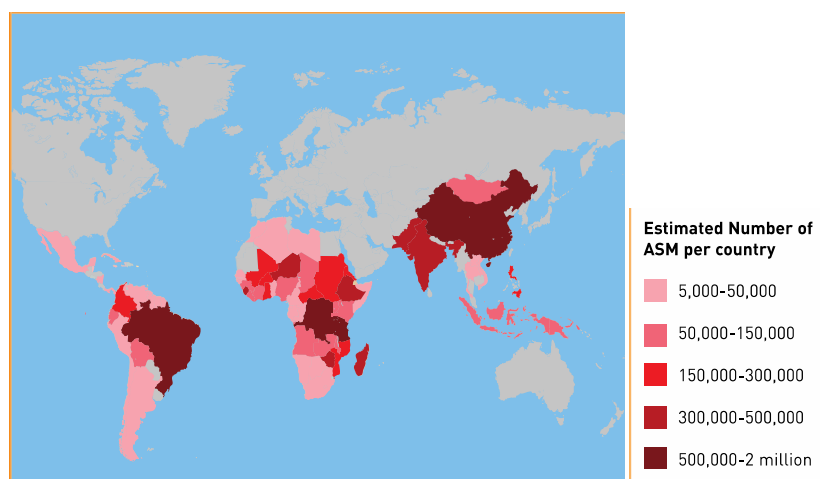
1 Introduction

1.1 Background and Relevance

The job of a small-scale miner is brutal: it is physically demanding, the health risks are enormous, and the take-away is almost negligible. But herein lies the key: it is only *almost* negligible and the small amount of money that a gold-miner can earn at the end of a day is more than is available to him anywhere else. Artisanal and small-scale mining (ASM) is, to a great extent, a poverty-driven industry. In 1999, the International Labour Organization (ILO) estimated that approximately 13 million people are directly involved in artisanal and small-scale mining,¹ including many women and children. Indirectly, another 80 to 100 million people in roughly 30 countries across the developing world depend on ASM activities in one way or another for their livelihood (Hentschel, Hruschka, and Priester 2003; Jennings et al. 1999).

There are a large number of different natural resources that are mined artisanally.

Figure 1: Distribution of artisanal and small-scale mining in the world



Source: "Working Together: How Large-scale Mining Can Engage with Artisanal and Small-scale Miners" 2013

¹ Since these estimates are almost 15 years old, it is quite possible that the numbers are even higher today. Regrettably, there have been no large-scale global studies conducted on ASM to provide more up-to-date information since 1999. Marieke Heemskerk provides a few insights on possible reasons for this lack of empirical data, such as the heterogeneity and transience of the sector (2005, 84).

As is evidenced by the national and international resource strategies published by a number of governments within the last few years (for example the German Resource Strategy and the European Union's Resource Initiative), the availability of non-energy raw materials is of great relevance to the industrial sectors of developed nations (BMW 2010). As more and more developing countries reach increasing technological maturity, competition for metallic resources, which are of particular strategic relevance, is rising (Wagner et al. 2007). This paper will therefore focus only on metallic ores, more specifically gold and the so-called '3Ts': tin (cassiterite), tantalum (coltan or columbite-tantalite) and tungsten (wolframite), since to date these are the only metals for which artisanal mines can be certified. The German Federal Institute for Geosciences and Natural Resources (BGR – Bundesanstalt für Geowissenschaften und Rohstoffe) estimates that ca. 10% of the world's gold production, 30% of its tin production, 20% of coltan production and 6% of wolframite production take place in artisanal and small-scale mines (Wagner et al. 2007).

These are by no means the only resources produced by ASM.² Because the sector is so large and consequently very diverse, it has been difficult to find agreement on a definition for the term 'artisanal and small-scale mining'. As a result, there is none to date. The term is generally applied to mining activities carried out by individuals, families or cooperatives with little or no mechanization, often (but not always) in the informal or illegal sector of the economy (Hentschel, Hruschka, and Priester 2003), with high labor input and comparatively low efficiency and income generation (Jennings et al. 1999). While some authors draw a further distinction between artisanal and small-scale mining (see e.g. Fisher 2007, 735), in this paper the two terms will be used interchangeably.

While ASM has existed for well over a century, it is only in the last fifty years that small-scale mining began to be recognized, albeit grudgingly, as a distinct sector of work. During the 1960s and 1970s, many governments tried to marginalize ASM by focusing their mining policies exclusively on large-scale mining (LSM) and simply ignoring ASM. However, in the mid-1980s, it became increasingly clear that this approach would not make ASM disappear, as had been hoped, and that the policy vacuum that existed with regard to this sector was instead causing severe problems (Fisher 2007, 736). At the start of the following decade, finally, "a consensus was emerging that a policy of treating artisanal

² However, for the rest of this paper, the term 'ASM' will be used only to refer to the small-scale production of gold, tin, coltan and wolframite.

miners as a marginalised sector that could be, in effect, legislated away, had failed” (Holloway 1998, 40; as cited in Fisher 2007, 736).

A first turning point in the relationship between states and ASM finally came in 1993, when the United Nations held a seminar in Harare that addressed both large- and small-scale mining. In 1995, the World Bank followed up with a Roundtable on Artisanal Mining and toward the end of that decade, a select number of scholars began doing some limited research on the sector (see section 2.1).

As a result of a number of factors, most of which can in one way or another be traced back to the effects of globalization, the number of artisanal miners around the world seemingly continues to increase. And just as it led to a rise in the ASM sector, globalization has also led to an increase in awareness of the problems that result from and those faced by small-scale mining, both socially and ecologically. While civil society has been at the forefront of pushing the ASM agenda more into the spotlight, in the wake of the significant success of the Fairtrade³ movement in agriculture and the steadily rising pressure on companies to pay more attention to the sustainability of their business practices, corporations and governments around the world have also begun to pay more attention to the plight of artisanal miners.

For some time now, there have been a plethora of voluntary initiatives indirectly connected to ASM, such as the OECD Due Diligence Guidance (see Section 5.2.3), the Extractive Industries Transparency Initiative and the Kimberley Process, but until recently, none of these standards were explicitly concerned with small-scale mining. A significant – albeit controversial – milestone in the fight to make small-scale mining more sustainable, both environmentally and socially, was achieved in 2010 with the passing of the Dodd-Frank Act in the United States.⁴ This law and its impact on ASM will be explained further in Section 5.2.3.

However, it is only with the introduction of certification schemes in the ASM sector that guidelines are being designed and implemented that specifically ad-

³ In this paper, ‘Fairtrade’ refers to products, ideas or standards associated with the Fairtrade Labelling Organization (FLO). ‘Fair trade’, in turn, refers to the general concept of creating an alternative supply chain that pays ‘fair’ prices.

⁴ At the time of writing, the European Accounting and Transparency Directives did not yet exist and were therefore not included in this research.

dress the dynamics of artisanal and small-scale mining. While the ideas behind some of these standards have already existed since approximately 2005, it is only within the last few years – since mid-2010 – that any mines could actually be certified.

There is still a long way to go before the conditions in ASM around the world can be considered acceptable from an environmental and human rights point of view, but the sector has started to capture the attention of policy- and decision-makers in the developed world, forcing them to begin the search for suitable solutions. As a result, while the topic of this paper may strike some as only relevant to a niche audience, I believe that its content will become increasingly relevant both for governments and corporations as regulations become more stringent in requiring proof not only of resource origin, but also of acceptable working and environmental conditions during the extraction process.

1.2 Objectives and Research Questions

It has been a little over two years⁵ since the first ASM mines were certified. In that short time, standards reviews and evaluations have begun to take place within the organizations that are in charge of the certifications. As they conduct their own internal assessments, I believe it is equally important to take a look at their performance from an outside perspective. Implementing certification schemes is costly both in time and money and it is worthwhile to analyze in detail to what degree problems within the ASM sector can be addressed through these mechanisms before making more of those investments. Consequently, this paper aims to perform such an evaluation through a two-pronged approach consisting of a theory-based analysis of the working mechanisms of certification and a review of empirical data from interviews with key players in the field of ASM certification research. This approach will be guided by the following research questions:

1. Can problems in the ASM sector be effectively addressed through certification? If so, which ones?
2. How do the mechanisms of certification need to be embedded into the greater institutional context in order to contribute to poverty reduction?

⁵ At the time of writing in early 2013.

1.3 Organization

To answer these questions, the paper will be structured as follows. Chapter 2 will give an overview of the current state of relevant academic research; chapter 3 will explain the methodology used; chapter 4 will provide background information on the problems in the ASM sector, and chapter 5 will describe the certification standards currently available for the ASM sector. Then, the analysis consists of chapter 6, which will outline the relevant theory and how it is applicable to certification, ultimately yielding a set of hypotheses, and chapter 7, which will analyze the information garnered from the expert interviews, evaluate the validity of the hypotheses and provide recommendations based on the outcome of the study. Chapter 8 concludes the paper and considers possible questions for future research.

2 Current State of Research

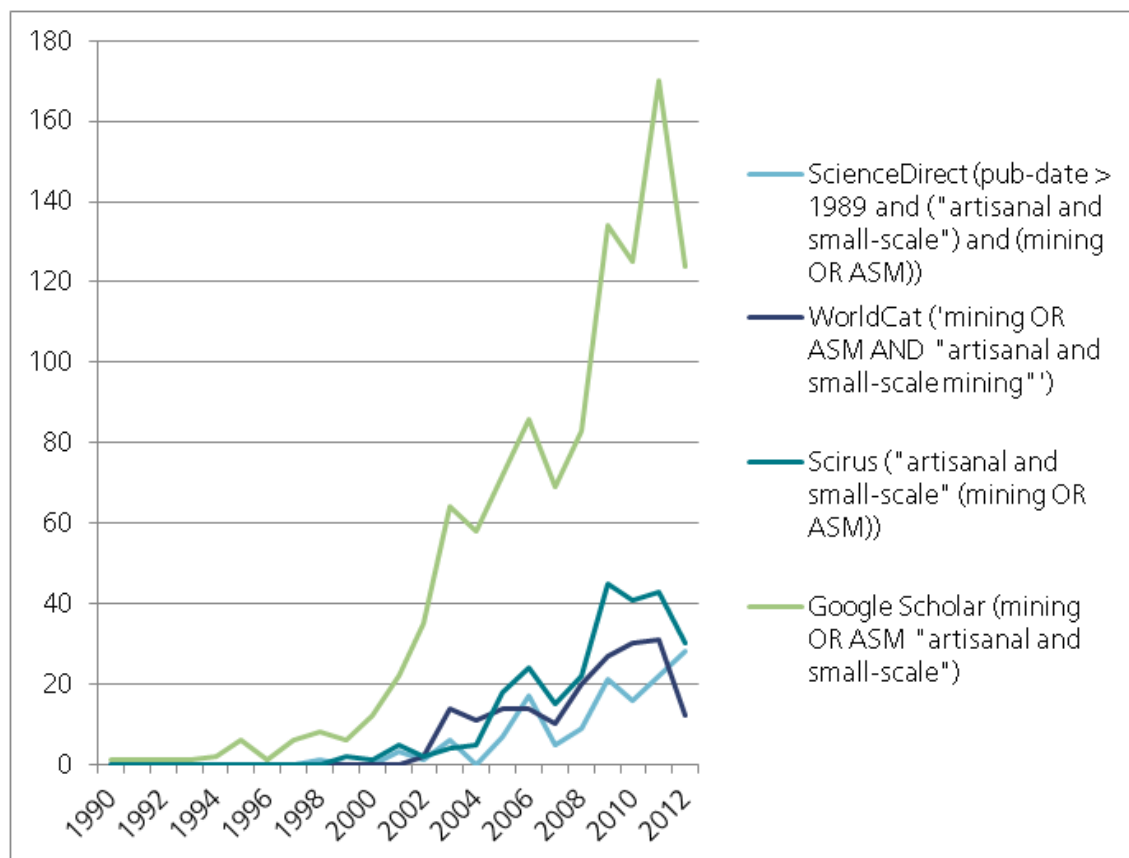
2.1 Artisanal and Small-Scale Mining

The difficulty in defining ASM has already been mentioned in section 1.1. Given the vagueness that continues to characterize both the definition and the true scope of artisanal mining, it may not come as much of a surprise to learn that one of the most important papers on the issues of small-scale mining is already well over twenty years old: Richard Noetstaller's 1987 "Small-Scale Mining: A Review of the Issues" continues to be cited regularly, as it is the only paper that provides concrete statistics about the reach of ASM around the world. Evidently, its numbers are long outdated and thus many authors now refer instead to the International Labour Organization (ILO)'s "Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines," though this document, too, was written over a decade ago and, in contrast to Noetstaller's work, does not provide nearly as many statistical details (Jennings et al. 1999). Nevertheless, these two works provide a fundamental overview of the sector and its opportunities and challenges and continue to be considered the seminal works of the field. Somewhat more recently, the consulting firm Projekt-Consult GmbH published another synopsis of the entire sector for the International Institute for Environment and Development (Hentschel, Hruschka, and Priester 2003), and parts of the BGR's 2007 study of certified trading chains (Wagner et al. 2007) also provide an introduction to the key factors to be considered in ASM.

Figure 2 shows the number of articles published each year in scholarly journals in four major academic databases, which include "artisanal and small-scale" in conjunction with either the term "mining" or "ASM" in their full text. Looking at this graphic, two things are readily apparent. First, scholarly publications on the subject increased significantly as of the new millennium, perhaps in part due to the Tripartite Meeting organized by the ILO in 1999 (Jennings et al. 1999). Second, in spite of this increase, the amount of research being done on the subject is still quite small. As a result, nearly all papers published on the subject, including the most recent, continue to base their work on numbers from the 1999 ILO report. On the one hand, this fact shows the importance of that particular publication, but at the same time, it is also an indicator that little work has been done on global reporting in the ASM sector since then. Instead, most authors have focused their efforts on particular countries and/or specific aspects of artisanal mining. For example, the first two issues in 2009 of the journal

Resources Policy were dedicated to “Small-Scale Mining, Poverty and Development in Sub-Saharan Africa”. While such a singular focus on one topic clearly highlights its importance in the current academic discourse, not one of the papers published on this occasion attempts to give an updated overview of the global situation of small-scale mining. Instead, the articles focus on very specific issues, ranging from discussing women’s roles in ASM (Werthmann 2009), migration patterns associated with the sector (Nyame, Andrew Grant, and Yakovleva 2009), and the relationship between small and large-scale mining (Aubynn 2009), to examining the role of formalization in ASM (Siegel and Veiga 2009).

Figure 2: Number of publications by year that include “artisanal and small-scale” AND (mining OR ASM)’ in the full text of the article as listed in various scholarly databases on 18 October 2012



Source: Original figure

Because the geographic distribution of ASM is less relevant to this paper than the types of problems and solutions that are common in the sector, the remaining review of the literature will be organized thematically, rather than by

location, although many authors do focus on particular regions or countries. Broadly, the literature can be grouped by those papers that focus primarily on the problems within ASM and those that consider specific pathways toward an improved situation.

Within the first category, the topic that has probably seen the most publications is the use and effects of mercury in small-scale mining (L. de Lacerda 2003; Jønsson, Appel, and Chibunda 2009; Hilson 2006; Banchirigah 2008; Hilson and Vieira 2007; Malm 1998; Mohammed Banchirigah 2006; P. van Straaten 2000; Ogola, Mitullah, and Omulo 2002; Hilson, Hilson, and Pardie 2007; Wolfgang C. Pfeiffer et al. 1989; Peter van Straaten 2000; L. D. D. Lacerda and Salomons 1998; Veiga 1997; W.C. Pfeiffer et al. 1991; Hilson and Pardie 2006; Harada et al. 1999; Spiegel 2009a; Spiegel 2009b; L. de Lacerda 2003). Gavin Hilson provides a detailed summary of the many works that have been written on the subject, though he is critical of the quantity of studies assessing mercury levels either in the surrounding areas or in the human population within ASM communities: “[I]ts utility is debatable. Each study draws similar, if not identical, conclusions: namely that the environmental media (e.g., water, soils, fish, etc.) within, and/or human populations comprising, artisanal and small-scale gold mining communities are contaminated with mercury. At best, these studies provide minimal additional knowledge” (Hilson 2006, 4). Instead, he advocates that future research in the area should focus on more pragmatic approaches to addressing the issues at hand and, most importantly, give greater consideration to the local populations involved, including soliciting direct feedback from them and trying to better understand the dynamics that dominate their local context.

Despite the prevalence of ASM research publications on mercury, the research makes clear that mercury is by no means the only factor threatening the health of small-scale miners and the communities in which they reside. The documentary “Glacier Gold” shows in great detail the many health problems affecting Rinconada, Peru, the highest altitude gold mining community in the world (*PERU, Rinconada: Glacier Gold Parts 1 - 3* 2009). The problems documented there are certainly not unique. The ILO report describes that miners around the world are negatively affected by exposure to dust, noise, and vibration as well as a conspicuous absence of safety equipment within the mines (Jennings et al. 1999). Banchirigah points out that many of the health problems, like the rapid spread of HIV/AIDS and prostitution in many mining communities, are partially a result of the illegality of operations and, in some political contexts (example: Ghana), also owe to the fact that ASM absorbs many displaced persons who have no other means to earn money (Banchirigah

2008, 31). This gives many ASM communities an aspect of transience that frequently leads to inadequate sanitation infrastructures, such as those seen in the above-mentioned documentary, which in turn promotes ideal conditions for the spread of communicable diseases (*PERU, Rinconada: Glacier Gold Parts 1 - 3* 2009). Another issue described here is the high levels of domestic violence that are caused, in part, by the neurotoxicological effects of mercury, which include an increase in aggression (*PERU, Rinconada: Glacier Gold Parts 1 - 3* 2009; Jennings et al. 1999).

Aside from the breadth of health problems, the local context Hilson emphasizes is also often characterized by exclusion from the rest of society. While this may be partially because a large number of small-scale mining communities are in geographically remote locations, there is also an important social component to take into consideration. Eleanor Fisher has considered the role of social marginalization in determining levels of social inequality and unequal access to resources and concludes that while legal integration can be beneficial for some miners, for others “adverse incorporation contributes to socio-economic dependence, exploitation and insecurity” (Fisher 2007, 735) and can, ironically, lead to further exclusion (Fisher 2008).

As the Global Witness Report on small-scale cassiterite mining in the Democratic Republic of the Congo (DRC) relates, these problems are only further compounded by poor governance (Global Witness 2005). This publication further emphasizes the economic difficulties associated with artisanal mining: the report discusses the problems associated with poor market access and transportation difficulties, smuggling of metals and the instability and volatility of world market prices for natural resources. Economic issues, such as the fact that many artisanal miners receive below-market prices for their ore, are also discussed by several other authors (Hilson and Pardie 2006; Hilson 2008a; Banchirigah 2008; Childs 2008)

2.2 Certification

The literature is by no means focused solely on describing the problems of the ASM sector. Many authors analyze different options for improving the situation for small-scale miners. Undoubtedly the most frequently discussed approach is that of formalization and legalization processes for artisanal miners, though it is very frequently seen in a critical light by those most familiar with ASM (Geenen 2012a; Banchirigah 2008; Mohammed Banchirigah 2006; Clausen, Barreto, and Attaran 2011; Hilson and Potter 2005; Lahiri-Dutt 2004; Siegel and Veiga 2009).

Other options include education initiatives (Maponga and Ngorima 2003; Hilson 2006), government-sponsored technical assistance for struggling workers (Spiegel 2009c) and the role of Processing Centers in improving the situation (Hinton, Veiga, and Veiga 2003).

Finally, another approach that has only recently begun to be discussed is that of certification through fair trade approaches or supply-chain due diligence standards. Because there are still few of these standards and even those that exist only entered the implementation phase around 2011 or 2012, there is remarkably little academic research to be found about them. A number of authors have mentioned the Fairtrade and Fairmined Standard briefly, generally focusing on critique and arguments for why it will not work, such as the illegality of most ASM operations and the interest of governments in keeping gold in-country to use it as additional currency (Childs 2008; Hilson 2008a; Imperato 2010; Bleischwitz, Dittrich, and Pierdicca 2012; Jönsson and Fold 2011). From a less analytical perspective, there are a handful of papers that provide a descriptive overview of certifications, initiatives and guidelines that are relevant to ASM (Cardiff 2010) and classify what is available according to a sustainability typology (Levin et al. 2012). A number of people directly involved in one of the certification programs have also published articles on certification in the ASM sector, although these focus more on describing their work than approaching them from an objective and critical standpoint (Hruschka and Echavarría 2011; Hentschel, Hruschka, and Priester 2003; Blore 2011; Blore and Smillie 2011).

Beyond that, the only recourse is to expand the search to works on fair trade or certification, either in general or in other sectors, although these are arguably poor substitutes, given how specific the dynamics of the artisanal mining sector are. A good overview of fair trade with an economic focus can be found in “Fair Trade: Ein Konzept nachhaltigen Handels” (Hauff and Claus 2012). Stefan Mann (2008) takes the economic analysis a little further, looking at the impact of price-competitiveness on the success of alternative trade networks and both Hogen (2012) and Rametsteiner (2002) look at certification from the perspective of theories of new institutional economics (NIE). Haufler, finally, looks at the concept from a more political and governance perspective, viewing certification as a “social regulation of the market” (Haufler 2003, 237).

While there may be quite a bit of work available on various forms of alternative trade or the impact of certification in other sectors such as forestry or seafood, very few authors have looked in-depth at the potential of certification

mechanisms to address the long list of problems prevalent in the ASM sector. This is the gap that this paper will address.

3 Methodology

3.1 Analysis of Literature

This section will briefly review the methodology employed in this research. First, an extensive review of the literature available on the subject of artisanal and small-scale mining was conducted. Using works that focus primarily on the problems within the sector, a detailed and categorized roster of the different economic, political, social, legal, safety and health issues common within artisanal mining was created (see Annex 1). This step served as an important foundation: only by first creating such a list was it possible to evaluate whether any particular measure to address problems in the ASM sector could be successful or not.

Measures which have already been taken in different mining contexts were also reviewed. This provided an insight not only into what has worked, but most importantly into the reasons why certain initiatives have *not* worked. Since projects within the development field often struggle with unforeseen difficulties, it was vital to take into consideration previous lessons learned in a particular area.

Finally, literature on certification, both within the ASM sector and, to some degree, in other areas was examined. The goal of this paper is not to evaluate one particular certification standard, but rather to look at the opportunities and challenges presented by certification schemes as 'institutions'. Consequently, the literature in this category included a variety of descriptive documents about specific standards as well as more analytical papers. In order to extrapolate the fundamental working mechanisms of certification standards, I consulted the most relevant theories from new institutional economics and governance theory. At the end of the literature review, hypotheses were established according to the roster shown in Figure 5 (Section 6.3) to guide the remaining work.

3.2 Expert Interviews

To complement the desk research, I conducted interviews with a number of experts from different backgrounds dealing with ASM and/or certification of metals. Methodologically, the interviews were semi-structured and guided using a set of open questions that I formulated ahead of time based on the above-mentioned hypotheses and the approach detailed by Gläser and Laudel (Gläser and Laudel 2009). Although ultimately not every interview included the same

questions, this preparatory work ensured that all important aspects were covered during the interviews, while at the same time providing enough flexibility regarding the order and follow-up of questions for the interview to take place as a natural conversation (Mayer 2009, 37).

A total of seven interviews were conducted. Where direct quotations are included in this paper, written permission was granted prior to their use. All other written and audio records of the interviews have been anonymized and kept confidential. The list of interviews that were conducted can be found in Table 1.

Table 1: List of expert interviews conducted

Interview	Sector	Expert	Organization
1	FT Jewelry Retail	Anonymous	Jewelry Retailer
2	Certification	Dr. Gudrun Franken	Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)
3	Certification	Dr. Felix Hruschka	Alliance for Responsible Mining (ARM)
4	Academia	Marie Müller	Bonn International Center for Conversion (BICC)
5	Academia	Dr. John Childs	London School of Economics
6	FT Jewelry Retail	Alan Frampton	CRED Jewellery
7	Academia	Dr. Gavin Hilson	University of Surrey

4 Problems in the ASM Sector

The objective of this chapter is to provide a brief overview of the legal, political, economic, health, social and environmental problems commonly found in the ASM sector. This background will provide an important foundation for the hypotheses in Section 6.3 and the analysis conducted in Chapter 7.

4.1 Political and Legal Issues

Because political and legal issues are so closely connected in this context and, at times, simply inseparable, they will be discussed together. Next to the environment, the single biggest issue that is repeated again and again with regard to ASM is its legal status, both with regard to mining licenses and to land rights. Trying to articulate the legal status of ASM *in detail* is a little bit like trying to define the sector's scope: a somewhat impossible task. Just about every paper that touches on the legality of ASM will say that 'many,' 'most,' or 'the majority of' ASM miners operate illegally or informally (e.g. Aubynn 2009; Geenen 2012b; Maconachie and Hilson 2011). And yet, even after months of searching, it is impossible to find a comprehensive list stating explicitly the countries where ASM is either legal or illegal and the applicable laws affording such information. Even the experts that were interviewed, some of whom have spent decades researching this sector, could only speak to the situation in a handful of specific countries that represented their field of expertise. This utter lack of information on something as basic as where it is legal to perform artisanal mining and under which conditions, and where this is simply impossible, regardless of land titles and mining licenses, testifies louder than any other statistic to the exclusion and marginalization of the sector.

Of course, the question of whether ASM is legal according to the letter of the law is not the only matter of relevance. Looking at two countries where there are legal provisions allowing for ASM illustrates this point quite clearly: in Ghana, ASM has been legal since 1989 and, yet, fewer than 25% of miners operate legally (Aubynn 2009). The Democratic Republic of the Congo presents a similarly grim picture: "more than half of the cassiterite and coltan production and more than 90 percent of gold production and export is 'informal', which means that it takes place beyond state control" (Geenen 2012b, 322).

Contrary to common misconception, however, this has little to do with miners' unwillingness to follow laws or pay taxes. Rather, these low numbers of legal operators are due to a number of obstacles that prevent those in the ASM sec-

tor from formalizing their operations – or that make it quite unattractive for them to do so. First, the costs – both financial and in terms of precious working time lost – are often enormous. Because most ASM takes place in remote locations, it can be quite expensive and onerous for miners to travel to the appropriate mining office to apply for a mining license, a trip that must often be repeated multiple times due to the slow and inefficient nature of many bureaucratic institutions (Geenen 2012b). Moreover, the application process is often not only slow but also difficult for those miners with little education and who are not accustomed to completing paper work and acquiring official documentation. The ILO wrote the following in 1999:

Small-scale mining is bedeviled with too many regulations that are mostly designed to constrain it...There is therefore little incentive for small-scale mines to conform, particularly if the risks of being caught and of sanctions being applied are minimal. If small-scale mining is to be encouraged to operate legally, legislation must be (at least) even-handed in allowing small-scale miners access to suitable land for prospecting and mining activities. It must be “user friendly” as far as the issuing of permits and the granting of licenses are concerned—permits that provide clear security of tenure for a reasonable period so that small-scale mining can become established (Jennings et al. 1999, np).

The fact that so little has changed in the last decade that this passage can still be cited as representative of the current status (Banchirigah and Hilson 2010, 163) shows that reform of the sector has not been anywhere close to successful. Moreover, it also becomes clear that, all things considered, the costs of formalization often simply outweigh the benefits for small-scale miners, and their decision to avoid these costs is actually quite rational.

For those who *do* want to operate legally, there is one significant issue that likely outweighs all other problems: the lack of available land. In many countries, the provision allowing for legal ASM was added to the books after the establishment of laws governing large-scale mining and, more importantly, after large land concessions had already been granted to multinational mining corporations. Even though LSM by no means makes use of all of the land that is available to it, small-scale miners cannot acquire mining licenses without land titles, which in turn are not available if the land has already been conceded to another entity (Banchirigah and Hilson 2010; Geenen 2012b). Cooperation between LSM and ASM is certainly not unprecedented and can at times be quite successful (Aubynn 2009), but it is still rare. Nevertheless, there are quite a number of reasons why it would make sense for LSM companies to engage with ASM miners more constructively: “risk minimization and security, managing reputa-

tional risk, maximization of community development opportunities, pressure for corporate accountability and maximization of company benefit such as exploration benefits and improved mine closure planning” all speak for increased cooperation (“Working Together: How Large-scale Mining Can Engage with Artisanal and Small-scale Miners” 2013, 12).

4.2 Economic Issues

In Section 4.1, the illegal status of ASM was discussed mostly from the perspective of the small-scale miners. However, the informality of the sector also has both advantages and disadvantages for the government, which are generally of a more economic nature. First, any work that takes place illegally cannot be taxed, leading to serious financial losses for governments of resource-rich countries (Hilson 2002). This gives the impression that it should be in the government’s interest to pave the way for small-scale miners to become formalized, but there is another side to the story:

gold, unlike coffee and other agricultural products, functions as a currency. Governments’ heightened interest in gold is driven by its foreign exchange value. Since gold can serve as a currency substitute, its acquisition is akin to obtaining foreign income. As Hentschel puts it: ‘the value of artisanally produced gold can be considered as a net contribution to foreign income, as freely convertible ‘currency’ is produced with pure local input’ [(Hentschel, Hruschka, and Priester 2002, 52)]. In other words, a government’s enthusiasm for exporting gold can be tempered by other macroeconomic objectives (Imparato 2010, 464).

This perspective also explains why it is illegal in some countries for individuals to export gold. In Zimbabwe, for example, all gold mined in the country must be sold to the government’s central bank, whose agents sometimes purchase it from artisanal miners for as little as 1/30th of its market price (Imparato 2010; Spiegel 2009c). Slightly less extreme, but equally unjust practices, have been reported in many other countries, including Ghana, Mozambique and Mali (Hilson and Pardie 2006). Sadly, in most countries, almost no money from the government returns to mining communities, regardless of how it is earned or ‘created’.

However, below-market prices are not just an issue when miners sell to crooked government officials. The remoteness of many small-scale mining locations makes both transport and market access difficult (Maconachie and Hilson 2011). As a result, most artisanal miners sell to the first of a chain of middlemen who, in part because they also provide other services, pay significantly less for

the purchased minerals than their worth on the open market (Hilson and Pardie 2006). In gold-mining communities – again due to their remote location and the willingness of many governments to ‘look the other way’ when it comes to the plight of artisanal miners – middlemen not only purchase gold in the supply chain, but also sell cyanide or mercury, provide insurance, and are generally the only ones willing to offer miners loans (Hilson 2008a). When all of this is put into the context of the instability and volatility of the price of natural resources, which makes long-term planning next to impossible for small-scale miners, it becomes clear that the multifaceted role of the middlemen leads to a relationship of total dependency between them and other members of the mining community. And more often than not, this power leads to abuse.

4.3 Health Issues

4.3.1 Miners’ Health and Safety

There are a large number of health problems associated directly with working in small-scale mining that primarily impact miners themselves. In underground mines, the constant exposure to dust, high noise levels, vibration and poor ventilation can lead to silico-tuberculosis (silicosis), headaches, breathing trouble, bronchial damage and permanent ear damage (Jennings et al. 1999; Hilson 2002). Combined with frequent over-exertion and long working hours, many miners suffer from “irritability, sleeping disorders and appetite loss” (Hilson 2002, 8). Since hygiene is often a problem inside the mines and because many remote mining communities lack adequate sanitation services, waterborne diseases such as malaria, dysentery and typhoid fever are common (Hilson 2002, 9).

Undoubtedly the most significant problem that is widely associated with small-scale mining is the use and effects of chemicals. In Latin America, for example, the process of extracting gold from ore includes the use of mercury, sodium cyanide and nitric acid, all of which can cause serious health problems, up to and including death (Jennings et al. 1999; New Jersey Department of Health and Senior Services 2006; New Jersey Department of Health and Senior Services 2010).

By far the worst offender, however, is mercury.⁶ Jennings describes the effects of the chemical on miners' health as follows:

Mercury vapour, which is released when mercury-gold amalgam is heated in an open cycle, is ingested through the lungs (up to 80 per cent of what is inhaled remains) where it becomes soluble as methyl mercury and is absorbed into the bloodstream causing: colic, vomiting and gastroenteritis; complaints of the kidneys and urinary tract; acute enteritis; and finally ulceration of the gums combined with extreme sensitivity to light. If mercury vapour is inhaled over a long period, chronic mercury poisoning occurs. The mercury penetrates the brain and causes tremors, speech disturbances, lack of concentration and mood swings (Jennings et al. 1999, np).

Since it is the miners themselves who suffer first and foremost from the negative effects of mercury, one would expect them to be the first to abandon its use. However, since the ill-effects of mercury poisoning only appear gradually, there are some miners who do not believe that its use is harmful (Hilson 2006). Moreover, because it is "effective, simple and cheap" (Jennings et al. 1999, np), and any other plausible alternatives are considerably more expensive and less effective, its use has continued for well over 5000 years (Hilson 2006). Thus, although the price of mercury has risen by over 350% since 2007 (Behrendt et al. 2007, 10), at \$56.00/kg⁷ it is still extremely low-priced in comparison to gold, which in 2011 was priced at approximately \$51,441.00/kg⁸ (Brooks 2012; George 2012). Unfortunately, apart from its continued use, its low price has also led to an attitude of "more is better," which often causes miners to use excessively large amounts of the chemical (Jennings et al. 1999, np). As a result, some artisanal mining practices release up to three times as much mercury into the environment as they produce gold (Hilson 2006), leading to high levels of mercury pollution, the ecological effects of which will be discussed in greater detail in section 4.4.

Yet another significant concern is the lack of safety equipment and sanitation facilities in small-scale mines:

⁶ While mercury is only used in artisanal gold mining (and by association also silver and at times platinum) (ARM 2012), the fact that gold mining is so widespread in the ASM-sector means that many authors do not distinguish between ASM and ASGM (artisanal and small-scale gold mining).

⁷ Price calculations based on 2011 World Bank estimates.

⁸ Price calculations based on 2011 World Bank estimates.

There is usually no collective or individual safety protection apart from that bought by the workers themselves. The majority of workers wear shorts, trainers and, sometimes, a shirt; helmets are occasionally worn; hardly anyone uses earplugs, mask or gloves; and there are no safety procedures for work in high or confined places. Liquid replacement is by drinking abundant quantities of water of dubious quality, without sugar or electrolytes. Few mines provide adequate latrines or showers; most provide only a tap where workers can partially clean themselves; some must make do with a stream. There are seldom separate areas for eating during the 30-60 minute midday break in an eight to ten hour shift (Jennings et al. 1999, np).

While some small-scale mines are technically under the supervision of local government, inspections of the working conditions in most small-scale mines are infrequent due to a combination of factors: mining offices are understaffed or too far away from most mines, overly bureaucratic structures lead to a continuous shirking of responsibility, or mining is simply done illegally. Insofar as they do happen, the “focus is often more on verifying production to ensure royalty payments are correctly calculated and collected than on safety and health” (Jennings et al. 1999).

In addition to the absence of standard safety equipment, the mines themselves are often built very haphazardly, leading to a significant number of accidents through cave-ins, gas explosions, fires and natural disasters, such as landslides, flooding and earthquakes (Jennings et al. 1999; Hilson 2002).

As an explanation for the high numbers of often-fatal accidents that take place in artisanal mining each year, Jennings states:

A combination of lack of resources, lack of or non-application of safety regulations, lack of awareness, illiteracy, lack of training, inadequate equipment and remote location all point to the likelihood of there being more accidents in many small-scale mining operations than in larger, more formal, more public mines. On the other hand, the nature of small-scale mining (low level of mechanization, low intensity of operation) means that some of the risks can be lower than in large, formal mines. Be that as it may, many fatal and disabling accidents do occur in small-scale mines and, as elsewhere, can be considered to be preventable (Jennings et al. 1999, np).

Jennings further adds that it is not uncommon for the next available first aid kit to be 10-20 km away from a mining site and the closest real hospital to be at a distance of 100 km or more (Jennings et al. 1999). Clearly, this significantly reduces the chances of being able to deal with an injury or even illness once it has occurred. Even when miners are able to reach a hospital in time, their illegal working status often keeps them from making use of this option for fear of getting not only themselves, but also their families and colleagues in trouble

with the law. These facts, in combination with the obviously inadequate safety and preventive measures in place at many ASM sites, make the sector one of the most dangerous fields to work in (Jennings et al. 1999).

In addition, factors such as illiteracy and lack of education likewise should not be underestimated. Superstition still plays a significant role in many rural areas and, when miners believe that the earth requires periodic (human) sacrifices in order to be bountiful (Jennings et al. 1999), fatal mining accidents take on a very different meaning. However, even if attitudes can be changed, it is often the lack of available capital that is the most significant cause of health and safety problems.

4.3.2 Community Health and Social Issues

Since mining communities often only spring up when people move to an area to mine, thus forming very organically, community and mining space are difficult to distinguish in some places. As a result, the community's health is likewise impacted by the mining activities, most significantly by the exposure to mercury, which can be found in the air, the water and condensed upon the corrugated metal sheets serving as roofs and walls of huts. While the level of exposure is somewhat lower for those not working directly with the chemical, symptoms similar to those described in section 4.3.1 are often also observed in non-mining community members (Spiegel 2009a, S550).

The transient nature and geographic remoteness of many mining communities also significantly impacts the quality of the infrastructure. It is not uncommon for the community to lack proper sanitation facilities and/or a functioning sewage system, and accessing clean water can be difficult, especially if the community relies on streams and rivers for its drinking water, which are often polluted by the mining activities. The combination of these various factors frequently leads to the outbreak and rapid spread of diseases such as malaria, cholera, tuberculosis and diarrheal diseases (Jennings et al. 1999). Furthermore, prostitution and HIV/AIDS rates are quite high in many ASM communities (Tschakert and Singha 2007) and are exacerbated by the fact that access to public health care is generally difficult to obtain and private physicians rarely settle in these communities due to the poor living conditions (*PERU, Rinconada: Glacier Gold Parts 1 - 3* 2009).

A final problem that deserves mention is that of child labor, which has recently been the source of significant controversy. On the one hand, there are those

who argue that mining qualifies as a Worst Form of Child Labor (International Labour Organization (ILO) 2005) and that any involvement of children in the ASM sector must be stopped. On the other hand, particularly in sub-Saharan Africa, child labor is a more complex and different issue than in the urban sweatshops of Asian countries, upon which large parts of the ILO's child labor laws are based (Hilson 2008b). Whether it is because in rural, agricultural societies – who are most closely related to mining communities – the help of children is often needed to help make ends meet (Interview 7 2013), or because of the increasing issue of children being orphaned by the HIV/AIDS epidemic (Interview 3 2013), forbidding child labor without exception can at times leave children worse off than if they are allowed to participate in the work force. This is not to imply that extreme cases like the Snake Boys in Tanzania, where children are forced to squeeze through tight openings deep inside mining shafts (US Department of Labor, Bureau of International Labor Affairs 2013), should be tolerated. Rather, a distinction must be drawn between this type of exploitation and asking children to fetch water or prepare food to support the activities of the miners in their community and applicable laws need to reflect this fact (Interview 7 2013).

4.4 Environmental Issues

The health problems caused by mercury both in miners and in their families have already been described in sections 4.3.1 and 4.3.2. In addition to the consequences to human health, mercury also has significant impacts on the environment, not only in the immediate location of the mines but also everywhere the polluted air and water spread. Samuel Spiegel has estimated that in producing approximately 500 to 800 tons of gold per year, artisanal miners release as much as 800 to 1000 tons of mercury into their surroundings, which can result in biomagnifications in the food chain (2009a, S550). This means that, for example, if waters are contaminated with mercury, fish originating in those waters will likewise contain high levels of the chemical and will pass this on to the people (or animals) who consume them. Thus, the contamination spreads indefinitely.

A number of attempts at technical solutions to this problem have been tried, but unfortunately, they have mostly ended in failure:

The individual aspect of much small-scale mining and the need for constant and regular cash flow, even of very small amounts, mean that it is difficult to promote techniques that have the benefit of economies of scale. In some

small-scale mining operations, for example, transactions involving as little as 0.1 gm of gold (worth less than \$1) take place (Jennings et al. 1999, np).

Even those options that do not rely on economies of scale, however, have been unsuccessful. One example is the use of retorts, which were originally highly praised by experts familiar with the techniques used in ASM, but unfamiliar with the social and economic realities on the ground. A retort “is a simple system assembled with a closed crucible connected to a condenser, [which] is designed so that mercury from gold amalgam evaporates when heated. The logic behind its use is that amalgam, if distilled within an enclosed circuit, produces minimal mercury pollution” (Hilson 2006, 7). Unfortunately, there are two significant problems with using retorts in ASM. First, the original models were not transparent, causing concern among miners that some of the gold might be lost in the process. Thereafter, glass crucibles were manufactured, but at a price of close to \$50/piece and a high likelihood of breaking in the less-than-ideal conditions of the field, these, too, were highly impractical (Interview 5 2013). A list of other environmental problems, which are at times associated with ASM, can be found in Table 2.

Table 2: Common environmental impacts resulting from small-scale mining activity

Environmental problem	Description
Deforestation	Mass tracts of forest cover are removed during exploratory and excavation processes.
Air pollution	As a result of ore roasting, quantities of sulphurous gases are emitted, many of which are loaded with heavy metal particles, mercury and arsenic.
Mercury pollution	Mercury is released uncontrollably into the environment, where it is transformed into toxic methylmercury.
Erosion	Overturning of land leads to erosion, leaching and inevitable siltation of streams.
Acid mine drainage (AMD)	Results from oxidation of discarded tailings, and the resulting acidic solution is toxic to aquatic animals and plant life.
Land degradation	Incomplete mine closure leads to “pot-holed” landscapes, which collect water and serve as breeding grounds for malaria-infested parasites.

Source: Hilson 2002, 8

As if the problems listed here and in section 4.3 were not enough on their own, they also often reinforce political and economic problems due to the social, political and economic marginalization that miners experience as a result of their poor reputation. Many people, not only in society at large, but also amongst

those working for governments, see the miners as dirty, illiterate and criminally-minded (Hilson 2008b; Fisher 2007), thus perpetuating an ongoing vicious cycle of poverty, illness and illegality that is extremely difficult to escape.

4.5 Armed Conflict

Volumes could be written about the relationship between and impact of armed conflict on artisanal and small-scale mining. However, because it is such a complex topic, a detailed description is far beyond the scope of this work and while the role of armed conflict is very significant in those locations where it is taking place, it is a topic that is not inherently part of the ASM discourse and currently only affects a fraction of small-scale miners. Its inclusion in this chapter is owed primarily to the prominence of the U.S. Dodd-Frank Act, whose legal implications will be discussed in greater detail in Section 5.2.3.

For now, suffice it to say that armed conflicts – most famously the one taking place in the DRC⁹ – can have a significant impact both on the miners in the affected country and, to some degree, on businesses all around the world. Because of their informality and the small scale of their operations, artisanal miners present an easy target for cooptation by militarized forces, and the resources they produce are an attractive booty for financing an ongoing struggle. When this fact becomes public knowledge on a global scale and politicians choose to act on it via legislation, the repercussions can be quite significant both for miners and consumers.

4.6 Summary

Looking at all of the problems in the ASM sector together, a general cause-and-effect pattern emerges. The political, economic and legal issues, which often prevent miners from taking the first steps necessary to improve their situation, are the cause, whereas the health and environmental problems follow as effects – or symptoms – of the precarious nature of the sector. This is not to say that addressing the first set of issues will automatically resolve the second set, but it is unlikely that the areas of health and environment will see significant im-

⁹ For more detailed information on the conflict in the Democratic Republic of Congo and its impact on ASM, see e.g. (Global Witness 2005; Garrett 2008; Pact Congo 2008; Geenen 2012a).

provement as long as the ASM sector continues to be mostly illegal or informal, with little or no financial stability and/or predictability.

One possible approach for resolving some of the issues in ASM will be presented in the next chapter, which describes the current certification standards available for the sector.

5 Certification

The aim of this chapter is to give some background on the types of available certifications and a general overview of the most relevant standards that currently exist in the ASM sector.

5.1 Types and Definitions of ASM Certifications

Not every certification program is the same and not every metal is suited to certification, at least not within the context of its artisanal extraction. Estelle Levin has created a useful typology of sustainability performance among ASM standards, which gives a helpful overview of the aim that each type of standard pursues. The following types of standards are listed in order of increasing sustainability:

1. **Chain of custody** standards that allow for the mineral's origin and chain of custody to be known, e.g., The Responsible Jewellery Council's (RJC) Chain-of-Custody standard.
2. **Issue(s)-based standards** that promote best practice in risk management on specific issues only, e.g., the International Cyanide Management Code (ICMC), the Extractive Industries Transparency Initiative (EITI), and Conflict Minerals Standards.
3. **Risk management standards** that promote best or good practice in risk management on a wider range of social and environmental issues than issue-based standards, e.g., the Organization for Economic Cooperation and Development (OECD) Guidelines for Multinational Enterprises.
4. **Sustainability standards** seek to mitigate risks and optimize on the development opportunity that the mineral capital presents. This mineral can be called 'sustainable', e.g., RJC's Code of Practices, the International Finance Corporation's (IFC) Sustainability Framework, the Alliance for Responsible Mining and Fairtrade Labelling Organization's (ARM/FLO) Standard for Fairtrade/Fairmined Gold (Levin et al. 2012, 19) [sic].

All of the standards in this typology rely on the concept of physical traceability, which means that minerals certified under these standards must always be identified as such and kept physically separate from non-certified materials ("Fairtrade and Traceability | Fairtrade Canada" 2013).

Building on these ideas, Table 3 provides definitions and examples of the key terms in the ASM certification discourse based on gold (though, for the most part, the definitions are just as applicable to other metals as well). Looking at the range of terms – this time in decreasing order of sustainability – two things

become clear: First, there are a significant number of different standards available, each of which pursues a slightly different goal, and second, it is anything but easy to tell them apart. The fact that neither sustainable and ethical nor conflict-free and conflict-managed imply the same thing makes it quite difficult to navigate this jungle of certifications.

Table 3: Conceptualizing key terms in the 'Conflict Minerals' discourse

Type	Description	Hypothetical Examples
Sustainable gold	Ethical gold which includes a deliberate effort to ensure the mineral capital contributes to sustainable development at all levels of the supply chain.	Gold produced in compliance with the Responsible Jewellery Council's Code of Practices or the ARM/FLO Fairtrade/Fairmined Standard for Artisanal Gold.
Ethical gold	Gold which has been produced and traded in ways that ensure that all social and environmental risks have been managed, but there is no conscious effort to ensure that the mineral capital contributes to sustainable development.	Gold produced by a corporate mine where the producer is fully compliant with national law and has instituted management systems for mitigating social and environmental risks associated with its operations. The corporate mine may take development actions but these would be judged to be ineffectual by an audit of performance against sustainability indicators.
Conflict-free gold ¹⁰	The same as for conflict-managed gold, but with a guarantee that the gold is 100% guaranteed for not having contributed to the financing of illegal armed groups.	Gold from Colombia that can be proven to have provided no benefit to the FARC. Gold assured by the EICC-GeSI 'conflict-free' smelter programme or the World Gold Council's Conflict-Free Gold programme.
Conflict-managed gold	Gold where the origin is known, and on which adequate due diligence and mitigation of those risks specified in the OECD Due Diligence Guidance (DDG) (relating to human rights abuses and armed conflict only) have been conducted. This is the basic minimum for some type of 'better' gold over and above conventional or 'bad' gold.	Gold from a conflict-zone, e.g., South Kivu in DRC, where the buyer has discovered that a consignment has been illegally taxed by an armed group but continues to engage with the conflict-affected supplier and institutes methods to prevent a reoccurrence of the violation.
Conventional gold	All gold the origin of which is unknown. This gold may or may not have been produced and traded in ways that cause irreversible damage to the environment and society at large, have involved human rights abuses and/or have financed armed conflict. This gold would have to be reported as "not DRC conflict-free" under the requirements of Section 1502 of DFA.	Most gold is in this category as gold is a commodity.
'Bad' gold	Gold known to be produced, traded and transformed in ways that cause irreversible or serious damage to the environment and society at large, have involved human rights abuses, and/or have financed armed conflict.	Gold mining that has been subject to illegal taxation by armed groups in DRC. Gold mined in Peru by children doing hazardous labour in contravention of ILO Convention 182. Gold smuggled across international borders. Gold mined by miners who rely on meat of an endangered species (e.g., chimpanzee) as their main protein. Etc. etc.!

Source: Levin et al. 2012, 19–20 [sic], © Estelle Levin Ltd.

¹⁰ “Note that it is a question of values as to whether conflict-managed or conflict-free gold is more ethical. Conflict-managed implies continued engagement to support suppliers move towards conflict-free status; conflict-free may involve disengagement from suppliers who might otherwise benefit from continued support. In this sense, conflict-managed may result in a larger number of conflict-free suppliers. Unfortunately, as section 4 clearly shows, the legislative environment incentivizes companies to seek to offer conflict-free rather than conflict-managed gold, even if the latter is more developmental” (Levin et al. 2012, 19).

Since the process by no means becomes less complex during implementation – rather the opposite is true – it is worthwhile to ask under what circumstances certification makes sense in the ASM sector. The effort entailed in certifying a mine is reasonable for metals where ASM plays a significant role in world production, which means mostly precious metals and those that are ‘low volume, high value’ (Interview 3 2013). Moreover, the mining process also plays a role. Alluvial mining is harder to regulate than hard-rock mining, since the alluvial process is much easier and faster and, therefore, lends itself better to informality (Interview 5 2013). Hard rock mining, on the other hand, is easier to control since miners are likely to work at the same site for a longer period of time. Therefore, alluvial deposits are more ‘lootable’ (Interview 4 2013; Interview 5 2013). On the consumer end of the supply chain, it is easier to successfully implement a certification program for products that require little post-processing production, since these tend to be easier to finance (Interview 2 2013) and consumers are more receptive to them. Along similar lines, the smaller the number of separate resources contained in the end-product, the better suited it is for certification, since it is easier to get customers’ attention for the plight of a particular producer group than for ‘resource producers’ in general (Interview 2 2013). Thus wood, coffee, tea and cocoa are ideal candidates, since customers buy them directly and individually, whereas electronic goods may be made up of many separate components that could be certified, but the certification process would become extraordinarily complex, both for companies and consumers, and, therefore, rarely takes place.

5.2 Overview of Current ASM Certification Schemes

There are many different certification programs in the ASM sector. Most of them have been started within the last five years and are thus still in their beginning stages. Two of these standards, the Fairtrade and Fairmined Standard for Gold from Artisanal and Small-scale Mining, including Associated Precious Metals (FT/FM) and the Certified Trading Chains (CTC) program will be discussed in-depth, since the analysis in Chapter 7 will focus on these two programs. A brief overview will also be provided of a number of other programs and laws to give a sense of what else is available. Table 4 assigns selected ASM certification standards into categories based on the types and definitions outlined above.

Table 4: List of selected ASM certification standards

Organization & Standard	Type of Standard	Type of Metal	Issues Covered	Metals Covered	Countries Covered
ARM/FLO FT/FM	Sustainability	Sustainable	Environment, Fair Working Conditions, Human Rights, Community Development, Fair Trade	Gold Silver Platinum	Peru Colombia Bolivia Ecuador
BGR CTC	Risk management	Ethical → sustainable	Environment, Fair Working Conditions, Security and Human Rights, Community Development, Traceability	3T Gold	DRC Rwanda
ITRI iTSCi	Risk management	Conflict-managed	Environment, Security and Human Rights, Legalization	3T	DRC Rwanda
ICGLR RCM	Risk management	Partially ethical → sustainable	Environment, Security and Human Rights, Economic (taxes), Traceability	3T Gold	DRC Rwanda Later: all 11 ICGLR countries
OECD DDG	Risk management	N/A	Security and Human Rights, Traceability	3T Gold	DRC Rwanda

Source: Original

5.2.1 ARM/FLO Fairtrade and Fairmined (FT/FM) Standard for Gold from Artisanal and Small-scale Mining (ASM), including Associated Precious Metals

At the moment, the FT/FM standard is the most widely known certification option in the ASM sector. It was created by the Alliance for Responsible Mining, which started with the development of a so-called Standard Zero around 2005 and continued working on it alone until 2008, although this early version was never implemented. Once the decision was made to situate the standard in the Fairtrade discourse, they approached Fairtrade International about a possible cooperation. Since ARM is highly specialized in ASM, but lacks the necessary market and licensing infrastructure that is needed to sell products under Fairtrade terms, such a partnership promised many benefits and synergies. FLO therefore agreed and pulled the independent organization FLO-CERT on

board to perform the audits and certification of ASM producers, as they already do in other Fairtrade sectors. By combining the core principle requirements of both Standard Zero and Fairtrade, the Fairtrade and Fairmined Standard came into being in 2010. The first mine was then certified in 2011 and the first kilogram of FT/FM gold was produced in 2012 (Interview 3 2013).

Since ARM is based in Colombia and the ASM sector is somewhat more advanced in Latin America than elsewhere in the world, FT/FM was first implemented there. Currently, a total of five mines have been certified: one in Bolivia, one in Colombia, and three in Peru. Plans to expand the standard to other parts of the world are currently being discussed, with Mongolia seen as the country likely to be next (Interview 3 2013).

The list of core requirements for certification is extraordinarily long, as can be seen below. It is divided up into four sections, each of which includes core and development requirements. Core requirements must either be met at the time of certification or within the first year – though the overwhelming majority is due at the first audit. Development requirements must be met by year three. The four sections are:

1. General Requirements with 16 core and 4 development requirements,
2. Premium Governance and Fairtrade and Fairmined Development Plan with 9 core requirements,
3. Environmental Protection with 17 core and 7 development requirements and
4. Standards for Labour Conditions with 37 core and 14 development requirements.

Requirements range from those pertaining to the legality of the operation – having consent from local and traditional authorities, paying all necessary royalties and taxes, etc. – to prohibiting the use of nitric acid for amalgamation, to requiring the ASM organization to form a Premium Committee, which must create a Premium Plan based on a needs assessment to decide how it can use the Fairtrade and Fairmined Premium (FT Premium) to promote sustainable community development.

In addition to being plentiful, many of the requirements are quite complex, such as the following three examples describing the ASM Organization (ASMO), which must be in place in order for a mine to become certified:

1.2.4 Year 0/Core: The ASMO must define its System of Production which includes a complete register of all participating miners, including areas,

processing units (domestic and industrial), external service provider, and a mining plan which indicates clearly where mining and processing activities take place.

1.2.5 Year 0/Core: The ASMO must establish an Internal Control System (covering all volume and sales into the Fairtrade and Fairmined supply chain) prior to certification that excludes mineral, gold or tailings from non-registered miners, areas and processing units.

1.2.6 Year 0/Core: The majority of the miners working in the scope of the ASMO must be comprised of community based artisanal or small-scale miners. Mining is done by themselves and their families;

- Owners/ members/ holders of the ASMO participate in mining activities or are dedicated to economic activities of the ASMO;
- Owners/ holders/ members of the ASMO are part of the mining community;
- Owners/ holders/ members of the ASMO are never shareholders of Industrial Mining Capital (ARM 2012, 36).¹¹

If and when mines succeed in acquiring FT/FM certification, they have the right to sell their certified gold under the terms of the FT/FM standard. These set a Fairtrade and Fairmined Minimum Price (FFMP) which “is set based on the London Bullion Market Association (LBMA) fixing for gold (Au)” (ARM 2012, 76). Additionally, buyers must pay a 10% FT Premium, which is “not only intended as a ‘reward’ for compliance with responsible mining practices, but also as a vehicle to deliver to the miners the necessary funds to make development happen” (ARM 2012, 76–77). Those mines that furthermore meet the requirements for Ecological Gold – meaning, among other things, that they no longer use any cyanide or mercury during extraction or processing – can charge a 15% Premium, with the extra 5% representing the Ecological Premium (ARM 2012, 78).

5.2.2 BGR CTC and ICGLR RCM

In December of 2006, 11 nations in Central Africa decided to form the International Conference on the Great Lakes Region (ICGLR), “dedicated to promoting

¹¹ The above requirements are an excerpt of the draft of Version 2.0 of the FT/FM standard. Approximately a year after the implementation of the certification, ARM began an extensive review process that involved many workshops and discussions with all relevant stakeholders, including small-scale miners. The first round of consultation on the proposed new standard – Version 2.0 – was finished in February of 2013. Changes will be made to the draft, followed by another round of public consultation and finally implementation of the updated standard between August and October of 2013 (ARM 2013b).

the peaceful social and economic development of the Great Lakes region” (Blore 2011, 21). They furthermore adopted the Pact of Peace, Stability and Development in the Great Lakes Region, which included the “Protocol Against the Illegal Exploitation of Natural Resources” and required the creation of a certification mechanism (Blore 2011, 22). Around the same time, the 2007 G8 Summit took place in Heiligendamm and on the advice of the BGR, the German government decided to take advantage of the opportunity to include ASM as a point of discussion on the agenda. Recognizing the connection between small-scale mining and the financing of the conflict in the Great Lakes Region, the leaders at the G8 summit ordered “a pilot study ... concerning the feasibility of a designed certification system for selected raw materials” to be conducted by the BGR in cooperation with the ICGLR (Blore 2011, 22). The result was the Certified Trading Chains in Mineral Production (CTC) Pilot Project in Rwanda and later the Democratic Republic of Congo, covering the so-called ‘3Ts’ of tantalum, tin and tungsten, as well as gold.

The BGR began drafting the CTC standard in 2008 and by mid-2009 began doing initial baseline audits at pilot mines in Rwanda. After the initial audit, the mine operators had one year to make improvements before the actual compliance audit to determine if they could be certified. The BGR sees the standard as a work in progress that currently consists of the following five principles, each of which contains between two and six more specific requirements:

Principle 1: Origin and volumes of produced and traded goods as well as company payments to host government are transparent.

Principle 2: The company does not use child labour and ensures fair remuneration and work conditions as well as continual improvement of health and safety measures for all employees.

Principle 3: The company ensures security on company sites whilst respecting human rights.

Principle 4: The company consults communities in which it operates and contributes to their social, economic and institutional development taking into account genders.

Principle 5: The company seeks continual improvement of its environmental performance (Blore 2011, 33).

Each requirement subsumed under these principles is rated on a scale of 0 to 4 for every mine. A mine must reach 60 out of a possible 80 points in order to be certified (Blore 2011). As of March 2013, four pilot mines in Rwanda had been certified and a number of mines in the DRC are participating in the certification

pilot phase, although implementation is more complicated and time-consuming in the DRC due to the conflict and political situation and thus no mines had been certified as of January 2013 (Interview 2 2013).

Unlike miners who attain FT/FM certification, mines with CTC certification do not receive a special premium. One of the criteria is that the price paid for resources must be 'fair,' though this term is not defined more specifically.

The German government has agreed to continue cooperation with the ICGLR until at least 2015, both through the BGR and other agencies. While plans for the future are subject to change, the CTC standard will likely be incorporated into the ICGLR's own standard, the Regional Certification Mechanism (RCM), which should be ready for implementation in the near future. For the time being, the CTC's standards on supply chain due diligence will be included as mandatory, while criteria on working and environmental conditions will be optional progressive criteria. The RCM may also include aspects of the International Tin Research Institute (ITRI)'s Tin Supply Chain Initiative (iTSCi), a mineral tracking and traceability system for artisanal cassiterite mining (Blore 2011). The ultimate goal is to make the RCM mandatory for all eleven member states of the ICGLR (Interview 2 2013; Blore 2011).

5.2.3 Brief Overview of Other Standards and Laws

While the OECD's Due Diligence Guidance (DDG) is not technically a certification program but rather a set of recommended, but voluntary guidelines pertaining to the conflict situation of the DRC and its neighboring countries, it is included here nevertheless, since many other standards are at least partially based on it. It is described as

a collaborative government-backed multi-stakeholder initiative on responsible supply chain management of minerals from conflict-affected areas. Its objective is to help companies respect human rights and avoid contributing to conflict through their mineral sourcing practices. The Guidance is also intended to cultivate transparent mineral supply chains and sustainable corporate engagement in the mineral sector with a view to enabling countries to benefit from their natural mineral resources and preventing the extraction and trade of minerals from becoming a source of conflict, human rights abuses, and insecurity (OECD 2011, 3).

The DDG has been implemented for tin, tantalum and tungsten since August 2011 and a gold supplement was adopted in July 2012, although it has not been implemented so far (Levin et al. 2012, 22). It is aimed at companies and rec-

ommends a five-step framework which focuses on managing risk through assessment, mitigation and reporting (OECD 2011 Annex 1). It is not specifically oriented towards ASM, but since it is situated at the end of the supply chain, there is no reason why companies implementing it could not apply it to resources they acquired from ASM producers.

There are a number of other initiatives whose presence ought to be acknowledged although they do not fit into the scope of this work. EcoAndina, Fair Trade in Gems and Jewelry/Fair Trade e.V./Faire Edelsteine, and the Global Mercury Project all work towards making the supply-chains that originate in the ASM sector more responsible, but do not have their own certification standards (Cardiff 2010). The World Gold Council's Conflict-free Gold standard and the Responsible Jewelry Council (RJC)'s Code of Practices and Chain of Custody standards are all certification standards, but do not apply to the ASM sector, although the RJC does have a Memorandum of Understanding with ARM/FLO (Levin et al. 2012).

Finally, while it is in no way a certification mechanism, the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act deserves mention here. While the majority of this Act is dedicated to the reform of the US finance sector, it includes one paragraph – Title XV, Section 1502 – that dictates new rules for companies' use of certain natural resources. The act requires reporting on all 'conflict minerals' – defined as coltan (columbite-tantalite), cassiterite (tin), wolframite (tungsten), and gold sourced from anywhere in the world – for any public companies "traded on US exchanges which are required to file quarterly reports to the Securities and Exchange Commission (SEC)" (Blore 2011, 66). Reporting must detail what the company has done to ensure that due diligence has been taken regarding both the origin and subsequent chain of custody of the minerals in question. Moreover, if any of the resources originated in the DRC or its neighboring countries, the report must also specify more closely which facilities were used for processing and as much information as possible about the mine of origin or, if this cannot be determined, what steps the company has taken in its attempt to identify the mine of origin. This report must be independently audited and then published on the company's website, thus making it publicly available (Blore 2011).

While this law does not impact miners and processors directly, they certainly feel the pressure of it passed down to them from above as companies work to comply with its requirements and avoid the label of 'DRC conflict product' or 'not DRC conflict-free' for their goods (Blore 2011). Interestingly enough, although

the law has led to an increase in awareness among large corporations of at least the issues pertaining to conflict minerals from the Great Lakes Region, ASM experts view it very negatively. Some question to what degree these reports are actually being checked by auditors and argue that the requirements of the Act are far away from reality (Interview 2 2013). There is also concern that the law has more than anything else led to a *de facto* boycott of the region's natural resources and an increase in smuggling, and has thus ultimately contributed more to hurting small-scale miners than to resolving the political conflict raging in the area (Interview 2 2013).

5.3 Summary

In spite of the relatively low profile of ASM issues on the global agenda, there are a large number of different standards and approaches that can be relevant to its certification. It is therefore necessary to look very closely at the specific requirements of each program to understand what that type of certification means – whether the aim is to increase sustainability and ethicalness, for example, or simply to allow for the retracement of the supply chain. Moreover, not every initiative is concerned with the same stakeholders – some prioritize benefits to artisanal miners, others are primarily concerned with the environment, and a third group is focused on corporate risk-management in the developed world. Every one of these initiatives has its place, but it would be a mistake to assume that every certification ensures the same type of production standards.

6 Theory

Having described the current state of ASM and certifications in detail, I now draw upon political and economic theory to analyze the concept of certification. Using global governance theory, I analyze third-party certification as a system of private governance. Then, I use concepts from new institutional economics – property rights theory, principal-agent theory and transaction cost theory – to analyze the economic framework of certification. With the exception of Section 6.1, all of the theory sections are divided up into two parts: an explanation of the theory in general and a discussion of how the theory can be applied to certification. In section 6.1, both aspects are examined together, since the theory is specific to certification and therefore cannot be separated from it.

6.1 Private Governance Theory

Over the last two decades, as the world has become increasingly connected through the mechanisms of globalization, a new view has appeared in political science that has split off from traditional international relations theory: that of global governance theory. Much like ASM, defining global governance is difficult and there are many different definitions used by scholars. One of the frequently cited definitions is from Rosenau, written in 1995: “global governance is conceived to include systems of rule at all levels of human activity – from the family to the international organization – in which the pursuit of goals through the exercise of control has transnational repercussions” (Rosenau 1995, 13; as cited in Dingwerth and Pattberg 2006, 379). Additionally, Dingwerth and Pattberg state that “the perspective of global governance recognizes [...] the existence of a multitude of forms of social organization and political decision-making, which are neither directed at the state nor emanate from the state, but are simply independent of it”¹² (Dingwerth and Pattberg 2006, 381). Third-party certifications can be seen as being carried out in precisely this context: they neither address the state nor do they come from it, but rather exist separately from it. Thus, they are considered forms of ‘private governance’ within the larger system of global governance. These, according to Falkner, “emerge[...] at the global level where the interactions among private actors . . . give rise to institutional arrangements

¹² Translated by MB. Original: “erkennt die Perspektive des globalen Regierens [...] die Existenz einer Vielzahl von Formen sozialer Organisation und politischer Entscheidungsfindung an, die sich weder an den Staat richten, noch vom Staat ausgehen, sondern schlichtweg unabhängig von ihm sind.”

that structure and direct actors' behavior in an issue-specific area" (2003, 72–73; as cited in Pattberg 2006, 581), which "can be understood as a functional equivalent of the public governing functions of states and international organisations" (Pattberg 2006, 581).

While much work has been done on public-private partnerships, "[r]esearch that explicitly deals with partnerships between private actors from a theoretical perspective is [...] rare" (Pattberg 2006, 580). However, one example of the work that has been done is Philipp Pattberg's analysis of the Forest Stewardship Council (FSC), in which he portrays the FSC as "a successful model of private rule making" and specifically examines its impact on actors from the global South. While the forestry sector certainly has a different set of dynamics from that of small-scale mining, looking at the working mechanisms of such a comparatively widespread certification mechanism as the FSC nevertheless provides a solid base for analyzing the same processes in the ASM sector.

In his study, Pattberg identifies three ways in which private governance can impact developing countries: regulative, cognitive/discursive, and integrative (Pattberg 2006, 582). The regulative function is perhaps the most obvious role played by certification mechanisms. In order for a certification system to work, rules and standards must be created, which can cause the behavior of actors to change according to the regulations. "Possible effects include changes in markets and economic incentive structures, environmental improvements or deterioration and impacts on social parameters such as working conditions and labour rights" (Pattberg 2006, 582).

The cognitive/discursive function is one that is particularly well carried out by the FSC, though it is not hard to conceive of systems of private governance which exist without it, as it is less inherent than the regulative function. Pattberg describes this function in the following way: "knowledge is produced and disseminated through a network of actors bound together by the constitutive rules of the institution" (Pattberg 2006, 582). This exchange of information can serve a valuable function for individuals in developing countries as it increases both their capacities and their contact to others in the same field. Moreover, such networking can lead to more rapid improvements within the organization and among its various members and ultimately leads to a greater degree of empowerment for the actors from the global South.

Finally, the integrative function can have two separate impacts. First, it can lead to the local integration of international or transnational norms. By requiring ad-

herence to these standards in order to become certified, this form of private governance creates a “legalisation’ of functional spaces wherein rules become enforceable (through the process of certification and the threat of withdrawing the respective certificate) that were not or only reluctantly enforced beforehand” (Pattberg 2006, 590). There is thus a transition from the public to the private realm. Second, integration can also work in the other direction, leading to standards that originated in certification requirements being adopted by national or international ruling bodies. This, in turn, is a transition from the private to the public realm.

6.2 New Institutional Economics

First called ‘new institutional economics’ by Oliver Williamson in 1975, this area of economic thinking is an offshoot from the long-established neoclassical tradition (Williamson 1975; as cited in Ménard and Shirley 2008, 2). It concerns itself with the institutional environment and, in particular, the interactions between institutions and organizations within that environment (Ménard and Shirley 2008, 1). Ménard and Shirley define institutions as “the written and unwritten rules, norms and constraints that humans devise to reduce uncertainty and control their environment” (2008, 1). They can include everything from laws and constitutions to contracts between business partners, as well as more informal and often unwritten codes, such as norms of behavior or beliefs. Organizations are defined as “groups of individuals who are formally connected to each other as a result of a common goal”¹³ (Voigt 2002, 79). Organizational arrangements, finally, are “the different modes of governance that agents implement to support production and exchange” (Ménard and Shirley 2008, 1).

Like more traditional economics, NIE considers the above units within the context of scarcity and competition, separating it from old institutional economics. However, in contrast to neoclassical economics, NIE does not fully accept the *homo economicus* model, which depicts humans as being perfectly rational and as having complete and free access to all information which could conceivably impact a decision (Voigt 2002, 19–21). In NIE, the assumption is instead that human rationality is limited, that information regarding a particular situation and its future consequences can never be complete, and that interactions between individuals in the market place are thus associated with so-called transaction

¹³ Translated by MB. Original: “Gruppen von Individuen, die aufgrund eines gemeinsamen Ziels formell miteinander verbunden sind.”

costs (Ménard and Shirley 2008, 1). These can include, among others, information, search, negotiation and enforcement costs (Voigt 2002, 22). NIE also qualifies the neoclassical assumption that every actor tries to maximize his utility, arguing that actors often ‘satisfice’ instead – they have a particular threshold level of expectations or aspirations that they aim to achieve. Only if this level is not reached do they begin to consider alternative courses of action that might lead to a higher utility level (Voigt 2002, 23).

Within the broader scope of NIE, two theories lend themselves particularly well to explaining the working mechanisms of certification schemes: transaction cost theory and principal-agent theory. These theories provide a framework for discussing the factors influencing the design of trade contracts and the *ex-post* and *ex-ante* problems that might arise in the formation of such contracts. While not necessary for analyzing the way certification schemes work, *per se*, a functioning system of property rights also plays a key role in shaping the environment within which certification operates. Moreover, the issue of land titling, which is a question of property rights, is one of the most significant points of discussion with regards to ASM. This section will therefore begin with a brief overview of property rights theory, before then discussing the analytical framework formed by the concepts of principal-agent and transaction cost theory.

6.2.1 Property Rights Theory

According to property rights theory, full ownership of a good implies holding a bundle of individual manifestations of property rights (Hogen 2012, 106). These can take on four separate forms (illustrated in the context of a resource):

- *usus*: the right to use the resource
- *usus fructus*: the right to appropriate profits from the use of the resource
- *abusus*: the right to change the resource
- *venditio*: the right to sell the resource (Erlei, Leschke, and Sauerland 2007, 294)

The price of a good depends, among other things, upon how many and which of these individual rights are transferred during a sale (Erlei, Leschke, and Sauerland 2007, 29). Thus, a good which can only be used, but not changed or resold, after purchase, would be cheaper in the marketplace than – *ceteris paribus* – one for which the customer receives the full bundle of property rights upon buying the good.

One of a number of reasons why property rights are important is because in many situations, the actions of one particular actor can cause effects which impact other people who were not involved in the original action. These are called external effects, or externalities, and can be either positive or negative in character. Erlei, Leschke and Sauerland define real external effects as the “impact of an actor’s actions upon the results of actions of other individuals, which (a) do not factor into the cost-benefit-analysis of the actor and (b) exist outside the price mechanism” (2007, 294).¹⁴ Harold Demsetz argued in 1967 that it is possible to internalize negative external effects using property rights so that those causing the externalities also pay a price for them (Demsetz 1967; as cited in Erlei, Leschke, and Sauerland 2007, 294). If the rights structure is properly laid out, this should cause a significant decrease in negative externalities and increase in positive externalities.

In addition to deterring actions whose negative externalities outweigh their private benefits, a well-organized set of property rights increases overall welfare by incentivizing good investment. If an individual can trust that his property rights are secure, he can spend the time and money he would otherwise have to use to protect his property from a takeover on more productive activities (Erlei, Leschke, and Sauerland 2007, 296). Furthermore, his willingness to invest in his property to increase its productivity is enhanced, because he can reasonably expect that it will still belong to him by the time long-term investments pay off (Erlei, Leschke, and Sauerland 2007, 296, 303).

Application of Property Rights Theory to Certification

In the context of small-scale mining, land rights are by far the most important form of property rights. At a minimum, miners must possess *usus* and *usus fructus* rights for not only the surface of the land, but also for the resources found in the ground beneath the surface. In many countries, this requires a mining or extraction license. Such land titles and licenses are a necessary and non-negotiable prerequisite for certification on two levels. First, certification schemes can only provide certification to those miners who work legally. Allowing miners who work illegally to become certified would undermine the standard’s legitimacy and reputation, thus defeating its purpose. Secondly, on a somewhat more

¹⁴ Translated by MB. Original: „Reale externe Effekte sind Handlungswirkungen eines Akteurs auf die Handlungsergebnisse anderer Individuen, die (a) nicht in das Kosten-Nutzen-Kalkül des Akteurs eingehen und (b) außerhalb des Preismechanismus angesiedelt sind.“

abstract level, it is generally only those miners who have the long-term legal security associated with land titles that are willing to invest the time, effort, and money that is required to acquire certification. Thus, while the theory of property rights does not explain the mechanism of certification, it clarifies one of the key preconditions for the certifying process to take place.

6.2.2 Principal-Agent Theory

Principal-agent theory originates in contract theory and describes the problems that can arise between a principal and an agent during the course of their interaction. The actor who requests that a particular action be carried out is referred to as the principal, whereas the person who carries out the request is the agent. The theory has three core assumptions: (1) that actors are always individualistically profit-maximizing, (2) that the parties to a contractual relationship have differing interests, and (3) that information is asymmetrically distributed between them (Hogen 2012, 112). As a result, the relationship between principal and agent is usually characterized by an imbalance of power, which leads to agency problems and in turn increases transaction costs. The information asymmetries can be classified into two categories, those that take place before a contract has been signed (*ex ante*) and those that affect the relationship after the contract is already in effect (*ex post*).

In advance of the contractual agreement (*ex ante*), problems arise from the fact that the principal cannot fully judge the quality of the agent's (future) performance, a situation which may lead to adverse selection. In the case of a purchasing agreement, the principal (buyer) does not know if the good in question has any so-called hidden characteristics, which the agent (seller) might be keeping from him. In this case, these hidden characteristics refer to the quality of the product and can be divided into three types. First, a good has search quality, which are "characteristics [. . . that] can be appraised before purchase" (Rametsteiner 2002, 165). Next, there is experience quality, "which can best be appraised when purchasing and using the product" (Rametsteiner 2002, 165). Finally, a good has credence quality, "which are product aspects that cannot be adequately assessed, even after purchasing and using the product" (Rametsteiner 2002, 165), usually because they do not leave any verifiable marks on the good.

Clearly, search quality aspects do not result in information asymmetries. Under the assumption that a faulty product can be returned within a set period of time, experience quality is also not a major problem for the buyer. However, insofar

as characteristics that fall under the category of credence quality are important to the purchaser, these can present a significant hurdle in making a purchasing decision, as the buyer has no way to ascertain these traits either before or after the purchase. Examples of credence quality traits are information regarding the production process of the good or the working conditions of the laborers during that process.

There are two options for overcoming this problem: screening and signaling. Screening is done by the principal and involves gathering information on possible agents in an effort to filter out which ones are most likely to supply products that comply with the necessary credence quality aspects (Hogen 2012, 117). Screening usually involves significant transaction costs as the search and evaluation process of information is often difficult and cumbersome (Rametsteiner 2002, 166). Signaling, on the other hand, is done by the agent, primarily as a means of marketing his product. Rametsteiner lists “reputation, licensing and certification” as the three main ways in which an agent can balance out information levels and signal to the principal that his product meets certain credence quality standards (Rametsteiner 2002, 166).

Ex-post problems, on the other hand, take place after a contract has been signed. These are generally limited to contracts that involve a longer-term relationship between principal and agent, in which the principal relies on the agent to complete a particular assignment on his behalf. Because the principal passes the task on to the agent and the costs of monitoring the latter constantly are usually prohibitively high, the principal cannot ascertain if the agent carries the task out optimally (Hogen 2012, 115). It is possible that the agent has access to hidden information or carries out hidden actions unbeknownst to the principal. Since principal-agent theory defines actors as being profit-maximizing, there is a risk that an opportunistic agent will try to use this hidden information or hidden actions to his advantage – and, in turn, to the disadvantage of the principal. This situation of uncertainty for the principal is referred to as moral hazard (Hogen 2012, 115).

Just as there were two solutions for adverse selection problems, principal and agent again have one option each for resolving moral hazard conflicts. For tasks for which the optimal result can be defined precisely and which are not strongly dependent upon outside factors, the principal can periodically monitor the performance of the agent and thus assess if the latter is fulfilling his contractual obligations adequately (Hogen 2012, 118). However, few situations meet the above criteria, thus this solution is somewhat limited. Alternatively, the agent

himself can choose to report on his progress from time to time (Hogen 2012, 119) and thus preempt any suspicion on the part of the principal.

In the case of moral hazard, there is also a third option which should ideally already be implemented during contract design: setting incentives in such a way as to align the interests of the principal and agent (Hogen 2012, 119). If done well, the agent's objectives should thus line up with those of the principal, eliminating the agent's incentive to keep information or alternative and more profitable actions to himself.

Application of Principal-Agent Theory to Certification

There are two sets of principal/agent combinations in the context of ASM certifications, as is summarized in Table 5.

In the chronology of the supply-chain, the first pair is between the organization issuing certification (principal) and the ASM organization (agent).¹⁵ Certification relies on periodic (usually annual) audits, during which the conditions relevant for the certification standard are reviewed. Outside of these inspections, however, it is impossible for the certifying organization to monitor all of the miners' activity as the transaction costs for this type of supervision would be prohibitively high. This leads to a risk of moral hazard and opportunistic behavior on the part of the ASM organization. To resolve this situation, the principal can either institute a system of reporting, where the agent is required to provide regular updates on the status of their work or align the interests of principal and agent in such a way as to make deception unattractive to the agent. The Fairtrade and Fairmined Standard does the latter by providing a Fairtrade Premium to miners who are certified as an incentive to stick to the rules. This bonus payment makes hidden action or the withholding of information a greater risk to miners, since losing the Premium would be a significant disadvantage to them if the truth came to light.

The second principal/agent combination takes place repeatedly along the rest of the supply chain, always manifested in the relationship between buyer (principal) and seller (agent). Here, the seller's concern is the product's credence quality, specifically the social and

¹⁵ The same relationship also exists between the ASM organization (principal) and the individual miners (agents), but this scenario falls outside the scope of this paper.

Table 5: Resolution of principal-agent problems through certification

Principal	Organization issuing certification	
Agent	ASM organization	
Information unavailable to principal	Principal cannot permanently observe/supervise agent's efforts	
Problem	Hidden action/hidden information	
Source of problem	Transaction costs associated with observation/supervision	
Consequences of problem	Moral hazard, risk of opportunistic behavior	
Concept for solution	Reduction of information asymmetry through monitoring or reporting	Alignment of interests
Actual solution	Systems of control, reporting	Incentives (premium), punishment



Principal	Buyer/Customer
Agent	Seller
Information unavailable to principal	Principal cannot adequately judge characteristics of good to be purchased (credence quality)
Problem	Hidden characteristics
Source of problem	Inability to assess certain qualities of a good by inspection
Consequences of problem	Adverse selection
Concept for solution	Reduction of information asymmetry through signaling or screening
Actual solution	Certification

Source: Original figure based on Hogen 2012, 121

environmental conditions at the extraction site of the resource. Once separated from the extraction site, nothing about the product's qualities (whether in the form of ore or anywhere else along the supply chain up to and including the end product) can give any indication of these conditions. Certification can help to overcome this uncertainty and thus avoid adverse selection. Labeling a product as meeting a fixed set of conditions allows customers to screen products based

on their proof of origin and sellers to advertise, or signal, the credence quality of their good.

6.2.3 Transaction Cost Theory

Transaction Cost Theory is part of the set of organizational theories that analyze and describe the most efficient and effective means of coordination for structuring transactions (Burr 2004, 104–105). The object of investigation for transaction cost theory is a single transaction, defined as the “transfer of disposition rights over resources [...], goods and services between actors” (Burr 2004, 105).¹⁶ These transactions, in turn, are associated with transaction costs (as defined in Section 6.2), whose value is determined by asset specificity,¹⁷ the strategic importance of the transaction to the firm’s overall goal, the amount of uncertainty associated with the transaction and the frequency with which the transaction will be repeated.

All of these factors must be taken into consideration when evaluating how to acquire a particular good or service, keeping in mind that the ultimate goal is always to minimize the sum of transaction and production costs¹⁸ (Burr 2004, 106). As a general rule,

“[t]he higher the specificity, strategic importance, uncertainty and the frequency of the transaction, the more likely it is that the transaction will be carried out using hierarchical coordination mechanisms within the firm. The lower the aforementioned determining factors are, the more likely it is that the transaction will be carried out using market-based coordination mechanisms [...]” (Burr 2004, 109).¹⁹

¹⁶ Translated by MB. Original: „Übertragung von Verfügungsrechten an Ressourcen [...], Sachgütern, und Dienstleistungen zwischen Akteuren.“

¹⁷ Asset specificity defines “how difficult or costly it is to move assets between different activities” (Hainmueller and Hiscox 2007, 1). If the asset specificity of a particular good is very high, it is hard to use it for any purpose other than the specific one for which it was originally intended.

¹⁸ For the sake of simplicity, production costs are kept constant in comparing different transaction cost models.

¹⁹ Translated by MB. Original: „Je höher die Spezifität, die strategische Bedeutung, die Unsicherheit und die Häufigkeit einer Transaktion sind, umso eher wird die Transaktion unter Einsatz von hierarchischen Koordinationsmechanismen innerhalb eines Unternehmens abgewickelt. Je schwächer die genannten Einflussgrößen ausgeprägt sind, umso eher wird die Transaktion unter Einsatz marktlicher Koordinationsmechanismen [...] abgewickelt.“

To do so, actors must consider a range of contract options which are more or less appropriate in minimizing transaction costs depending on the given situation.

Table 6: Attributes of the Contracting Process

Behavioral Assumption			Implied Contracting Process
Bounded Rationality	Opportunism ²⁰	Asset Specificity	
-	+	+	Planning
+	-	+	Promise
+	+	-	Competition
+	+	+	Governance

Source: Williamson 1985,31

Table 6 shows the three relevant behavioral assumptions that determine the type of contract that is most appropriate.

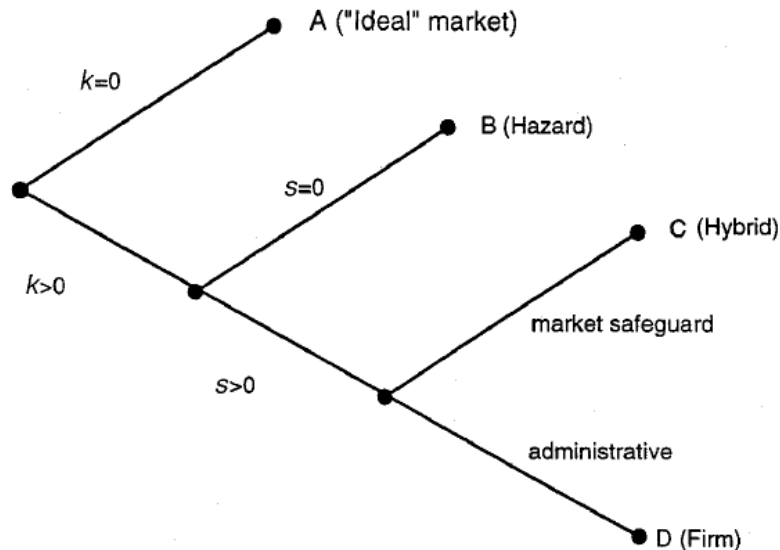
If rationality is unbounded – i.e. perfect – then all eventualities can be sufficiently taken into account even in the presence of opportunism and asset specificity to allow transactions to be governed by nothing more than meticulous planning. However, since human rationality is always bounded, this option is entirely theoretical. Next, if there is no opportunism but rationality is bounded and asset specificity is high, a promise between two actors is enough for the transaction to take place, since without opportunism neither party has an interest to default on their obligations. The combination of bounded rationality and opportunism, but no asset specificity, lends itself well to market-based competition where each transaction can be negotiated anew if necessary. Finally, given the presence of all three characteristics, the market is too risky and another form of governance must be put in place for transactions to take place.

The last two options can be seen in Figure 3. Here, *k* represents the degree of asset specificity and *s* stands for available market safeguards. Without asset specificity, transactions take place freely on the market (A). When $k > 0$, there is risk associated with the transaction since an early termination of the transaction would lead to losses for one or both parties. As a result, there is an incentive to create safeguards, *s*. Without these ($s = 0$), the transaction is hazardous (B). By putting market safeguards in place ($s > 0$), the two transaction partners increase

²⁰ Defined as “self-interest seeking with guile” (Williamson 1985, 30).

their commitment to each other and thus implement a form of hybrid governance (C). If the commitment is increased enough, the two partners eventually become part of the same firm, which has then internalized the transaction (D).

Figure 3: Simple Contracting Schema



Source: Williamson 1998, 38

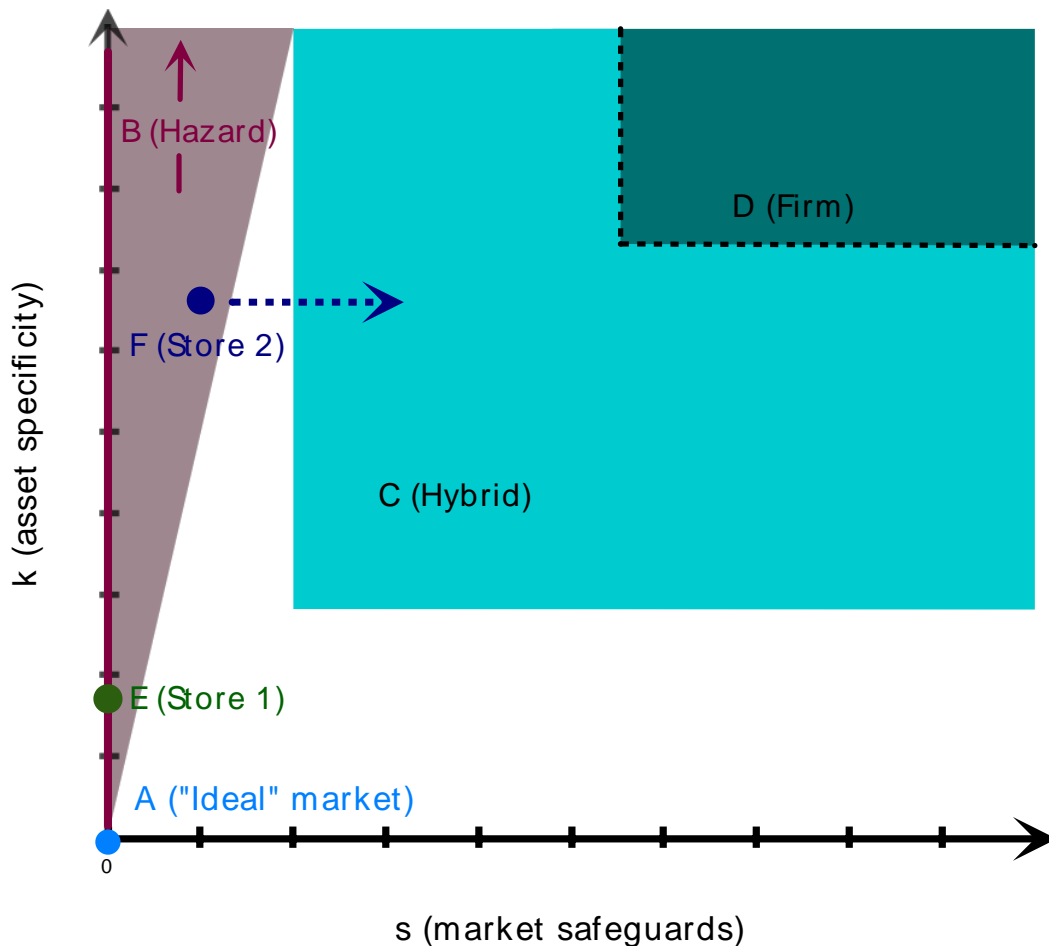
Application of Transaction Cost Theory to Certification

The application of Transaction Cost Theory to certification is not immediately obvious. For the sake of clarity, it will therefore be presented here using a concrete example: the sale of Fairtrade and Fairmined gold in the jewelry sector, both as a specialty line in a store that also sells conventional gold (Store 1) and as the exclusive offering of a retailer who specializes in ethical jewelry (Store 2). Opportunism and bounded rationality are givens in both cases, eliminating planning and promise as suitable contract options and leaving only market-based and hybrid solutions. The specificity of the asset is here based not on the physical commodity being purchased – gold –, but rather derives from its certification. Given the different philosophies of Stores 1 and 2 concerning the sale of conventional vs. Fairtrade gold, it can be argued that the asset specificity of certified gold is higher for Store 2 than for Store 1. The latter could, if necessary, sell its Fairtrade gold as conventional material and would lose only the 10% Fairtrade Premium as sunk cost. Store 2, on the other hand, would have to change its entire marketing concept to do the same, sacrificing a significant unique selling point of its business. Its second-best use for the certified gold is thus significantly more costly than for Store 1. Consequently, the strategic im-

portance of Fairtrade gold is much higher for Store 2 than for Store 1. Given the novelty of certification in this sector, uncertainty is likely to be high for both stores. The frequency of transactions is largely dependent upon the size of each store, but given Store 2's complete reliance on Fairtrade gold for its products, it is likely to have a higher frequency of transaction.

Figure 4 shows Williamson's Simple Contracting Schema (Figure 3) mapped onto a standard XY-graph, including the positions of Stores 1 (E) and 2 (F). Given the low asset specificity and low strategic importance, which are the two most important determining factors (Burr 2004, 108), Store 1 would be well-served in relying on

Figure 4: Transposition of Williamson's Simple Contracting Schema onto an XY-Graph



Source: Original figure

market-based (competition) solutions. Looking at Figure 4, k is above 0, but not significantly so and $s=0$, since there are no particular market safeguards in place, thus situating Store 1 at point E, where they face some hazard in the transaction, but it is limited.

Store 2, on the other hand, falls into the governance category in Table 6. Because its k -value is more significantly above 0 than that of Store 1, it moves further away from the origin and thus into a region with greater hazard. Since 80% of the price of Fairtrade gold must be paid ahead of time, outstanding payment hardly qualifies as a market safeguard. However, demand for Fairtrade gold is still very low and as a result, certified miners must compete intensively on the basis of their reputation, which may be seen as a type of safeguard, albeit relatively weak. Store 2 can thus be placed at point F in Figure 4. Given high enough demand from consumers, it would likely make sense for Store 2 to enter into a hybrid form of governance with ASM producers to reduce risk and uncertainty for both parties.

6.3 Hypotheses

Jewellery with the Fairtrade and Fairmined gold stamp is extra special. Buying it means you know the small-scale and artisanal miners were paid a fair price, giving them financial security. They also receive an extra amount of money to invest in building the future of their families and their communities, through education, medical care or environmental projects (“The Fairtrade Foundation | Fairtrade” 2013).

CTC offers mineral producers the potential for better market access, higher earnings through direct sales, improved planning reliability, sales agreements as a basis for finance, and better health and safety as well as environmental conditions (Blore 2011, 16).

The two assertions shown above illustrate the promises that many people – whether they are implementers, producers, or customers – associate with ASM certification: that purchasing a certified product leads to better conditions and development in mining communities. However, given the theoretical underpinnings of certification that were just described above, it is questionable to what degree such systems can accomplish the type of development these statements seem to indicate. By combining the background information about the problems in ASM (Chapter 4) with the theories described above, the following three hypotheses were established to guide the rest of this paper:

1. Unless the certification process is coupled with other development²¹ measures, as well as an appropriate institutional environment, only a small subset of the problems from the ASM sector can be resolved by it.
2.
 - a) With regards to the first steps of development, certification schemes simply confirm that development has already taken place and problems have been resolved, rather than actually leading to development.
 - b) At more advanced stages, certification can contribute to development and make that which has already taken place more sustainable.
3. Certification schemes can only lead to a change in behavior if the requirements are realistically achievable in a foreseeable future for those who do not yet meet them. Thus, it is essential to have an extensive support system to help producers who are not yet certified reach levels of development necessary to become certified.

²¹ The term 'development' has been used several times in this paper. It would be outside of the scope of this paper to enter in detail into the philosophical debate surrounding its meaning. Thus, without trying to define it with absolute precision, it is used here to suggest an improvement of the living, working, and environmental conditions associated with the ASM sector and as described in detail in Chapter 4.

Figure 5: Roster showing relationship between hypotheses and theoretical foundations

Theory	Mechanism	Manifestation in certification	Hypothesis	
Private Governance Theory	Regulative	Set goals/requirements	1. Unless the certification process is coupled with other development measurements, as well as an appropriate institutional environment, only a small subset of the problems from the ASM-sector can be resolved by it.	
	Integrative			
Principal-Agent Theory	Screening	Check/report on progress towards goals/requirements		
	Signalling			
	Monitoring			
	Reporting			
	Incentive-setting	Incentives are paid out once goals have been reached.		
Private Governance Theory	Cognitive/discursive	Network development (not well enough developed yet in ASM sector to provide necessary support and resources.)		
Private Governance Theory	Regulative	Set goals/requirements		2a. With regards to the first steps of development, certification schemes simply confirm that development has already taken place and problems have been resolved, rather than actually leading to development.
	Integrative			
Principal-Agent Theory	Screening	Check/report on progress towards goals/requirements	2b. At more advanced stages, certification can contribute to development and make that which has already taken place more sustainable.	
	Signalling			
	Monitoring			
	Reporting			
Private Governance Theory	Cognitive/discursive	Network development (not well enough developed yet in ASM sector to provide necessary support and resources.)		
Principal-Agent Theory	Incentive-setting	Incentives are paid out once goals have been reached.	3. Certification schemes can only lead to a change in behavior if the requirements are realistically achievable in a foreseeable future for those who do not yet meet them. Thus, it is essential to have an extensive support system to help producers who are not yet certified reach levels of development necessary to become certified.	
Private Governance Theory	Cognitive/discursive	Network development (not well enough developed yet in ASM sector to provide necessary support and resources.)		

Source: Original figure

The roster in Figure 5 clarifies the relationship between the theories, their manifestation in the certification process and the hypotheses, which will be evaluated in greater detail in Section 7.3.

7 Evaluation of Hypotheses based on Interview Results

This chapter will begin with an in-depth review of the interviews that were conducted. Thereafter, in Section 7.2, I will evaluate this information through the lens of the theory described above, and assess the validity of my hypotheses in Section 7.3. A set of recommendations based on the insights gained throughout this process will be presented in Chapter 8.

7.1 Summary of Interview Results

As previously described in Chapter 3.2, seven interviews were carried out with experts. Two of these experts are representatives of certifying organizations (BGR and ARM), three experts work on ASM from an academic perspective, and two experts are jewelry retailers who sell products made of Fairtrade and Fairmined gold. While every person had a different perspective on the issues surrounding the use of certification in the ASM sector and there were some clear disagreements, all of the interviewees were of the opinion that certification is a worthwhile approach in a sector that is strongly in need of development and reform. Likewise, all of the experts agreed that there are still many problems that need to be addressed and a long way to go until the systems work as planned.

This section will provide a detailed summary of the information that was collected from the expert interviews, arranged by topic rather than by interview question. It begins by considering what certification is meant to accomplish in Section 7.1.1. Against this backdrop, Section 7.1.2 examines the issues that miners struggle with the most, while 7.1.3 lists the most important institutional prerequisites mentioned by the experts. Sections 7.1.4 and 7.1.5 conclude with the experts' opinions on whether the current certification standards are appropriate and whether certification is an effective approach to development. While not every single answer is included, an effort has been made to provide a representative overview of all the stated opinions and viewpoints.

7.1.1 Merits of Certification

A significant amount of interview time was spent on discussing all of the things that are not yet working. Because all of the certification systems are still quite

young, however, it seems appropriate nevertheless to start with what certification is currently able to accomplish.

In those countries where small-scale mining is seen as a legitimate employment opportunity, there are generally laws on the books about how mining should take place. However, due to poor governance or corruption issues, these laws are often not sufficiently enforced. Certification represents one opportunity to circumvent this problem by moving the responsibility of enforcement into the private/third-party sector (Interview 2 2013). As a result, producers who are following the rules and making an effort to conduct their work responsibly can be rewarded – in the case of CTC by receiving a fair market price (Interview 2 2013), under FT/FM through the added Fairtrade Premium and/or Green Premium that is paid in addition to a 95% share of market price (Interview 3 2013; Interview 6 2013). These terms not only provide clear financial incentives to miners to continue with the positive changes they have already begun making, but also, in the case of FT/FM, provide them with up-front capital which they can invest into their mines and use to advance their operations further (Interview 5 2013). The more advanced their businesses become, particularly with regard to their organizational and management capacities, the more they also benefit from a higher level of productivity and efficiency, which of course also leads to greater profit (Interview 3 2013). Finally, many miners in those mines that have been certified in Latin America have reported that their level of prestige has increased in society as a result of certification. This is by no means a trivial matter, as they have found that this lends credence to their interactions with government officials and reduces the amount of stigmatization and stereotyping among their fellow citizens (Interview 3 2013). As expressed by one interviewee, the biggest accomplishment to date of certification schemes is that they finally recognize artisanal and small-scale miners as the valuable members of the supply-chain that they are (Interview 5 2013), thus achieving a goal that ASM ‘activists’ have pursued now for over forty years.

Looking at matters from a more global perspective, certification also increases the level of transparency of mining transactions (Interview 2 2013). Many of the metals that have been certified²² meet the requirements of the Dodd-Frank Act. Even for those not obligated to comply with this law, as awareness of resource scarcity and related problems increases, the pressure on companies to make

²² Depending on the certification standard.

their production more sustainable and ethical is continually rising; the use of certified metals is one possible response to such pressure.

7.1.2 Challenges and Difficulties for Small-Scale Miners

In spite of their merits, the demanding standards of most certification regimes pose a great challenge for the majority of small-scale miners. In discussing these in greater detail, it is vital to distinguish between different geographic regions, specifically between Latin American ASM and the sector in Sub-Saharan Africa. The first important difference between the two continents is the context within which ASM is taking place. There are more countries in South America where ASM is accepted as a legitimate form of employment and the overall conditions – in terms of infrastructure, conflict, corruption, etc. – are more favorable. One expert estimated that small-scale miners in Sub-Saharan Africa are approximately ten years behind those in Latin America in terms of their structural organization and ability to “fight the corporate battles” that are necessary for a larger scale of exportation (Interview 6 2013). Another felt that “those standards ask a lot, they ask an awful lot” of miners in Sub-Saharan Africa (Interview 5 2013).

Regardless of this distinction, however, most experts agreed that the biggest hurdle for the artisanal mining sector across the board stems from its current legal status. No mine can be certified without operating legally (Interview 3 2013), as doing otherwise would significantly compromise the legitimacy of certification. As mentioned earlier, there are countries where ASM is by definition illegal, thus eliminating any chance for those miners to become certified until a change in those laws has been achieved (Geenen 2012a). Even where it is legal, the bureaucratic requirements can be steep and the process lengthy (Geenen 2012b). Administrative hurdles aside, working legally also means possessing a land title and, in some countries, a mining or extraction license (Interview 5 2013; Interview 7 2013). The former, in particular, can cause a lot of problems. In many cases, large-scale mining companies have been granted far-reaching land concessions for their operations, since governments are particularly interested in attracting these multinational corporations to their economies. Often, however, LSM companies only make use of a fraction of their land, since they are only interested in those areas where they can extract ore profitably using large machinery. This is by no means the case everywhere: “75% of the time, small-scale miners and large-scale miners target very different deposits” (Interview 7 2013). Although this land is not being actively used, small-scale

miners are officially not allowed to work on it and thus have no chance of being certified if they set up operations there nonetheless (Interview 7 2013).

The second major difference between continents, which is specific to mining, is based on the geology of the two regions and applies specifically to the gold sector. Unlike Sub-Saharan Africa, South America has significant quantities of freely occurring gold that can be mined without the use of mercury to amalgamate or cyanide to leech it from other rock formations (Interview 7 2013); therefore, any standard that includes environmental requirements pertaining to the use of chemical agents is much easier to comply with in Latin America than in Africa. This, in turn, also makes the Green Premium of the FT/FM Standard next to impossible to meet in Sub-Saharan Africa (Interview 5 2013). Consequently, it should come as no surprise that one of the greatest hurdles for small-scale miners in Sub-Saharan Africa is the fact that most certification standards attempt to limit the use of mercury and/or cyanide in ASM. While researchers have found that knowledge of the dangers of mercury – particularly its noxious impact on health – has spread to most regions, “they still use it because it’s the only opportunity, really, to make a profitable business” (Interview 5 2013). This statement is also supported by the BGR’s experiences with its certified trading chains, which show that environmental problems tend to be the hardest to fix, since they usually require greater financial resources to correct than other problems (Interview 2 2013).

Another barrier to certification in many communities across the globe is the complex relationship between miners and middlemen. Based both on anecdotes from the interviews and references in literature, traders and middlemen that buy extracted ore from miners and re-sell it to the next link in the supply chain are extremely vilified (Interview 4 2013; Interview 5 2013; Interview 6 2013; Hilson and Pardie 2006). This reputation is certainly not unjustified: their loans can come at interest rates of up to 50% per day, they often pay significantly less than world market prices for the ore, and are generally seen as having found a way to legally steal from the miners (Interview 4 2013; Interview 6 2013). At the same time, however, they also provide essential services to mining communities (e.g. access to credit, security, etc.) that would otherwise remain unfulfilled: “these guys are doing what the donors [...] and governments should be doing, so they’re filling a very significant void” (Interview 7 2013). Additionally, because the miners themselves are so often seen as outcasts from society, they often have no one else to turn to and consequently their bond to these ruthless traders can often be quite strong: one miner in Tanzania described them as “like family to me” (Interview 5 2013). Even when the relation-

ship is less emotional, the middlemen are almost always strongly integrated in the everyday life of the community. As a result, one expert declared: “whether they’re doing it in a good way or a bad way, they’re a necessary part of the existing system” (Interview 7 2013).

Like the work of many small-scale miners, the role of these middlemen is often informal, at best, and illegal at worst. Their networks are difficult to untangle because they are often kept clandestine, making parts of the supply chain between producer and consumer completely nontransparent (Interview 5 2013). Because of the illegality of their business and the lack of transparency, every certification standard includes conditions that require the elimination of middlemen from the supply chain. Understandably, there is thus great resistance from the traders to the implementation of certification, since – demonized or not – they, too, need to make a living and hardly face much better conditions than the miners (Interview 4 2013; Interview 6 2013). Coupled with the miners’ “fundamental mistrust of the development apparatus” that stems from decades of failed or prematurely abandoned aid projects (Interview 5 2013), many miners choose to stick with what is familiar:

“in a lot of cases it was the people you trusted. [Someone from the outside] said: ‘I’ll give you a better price for your gold’ and that’s not what [the miner] wanted, he wanted to ensure that he was working with someone [...] that he trusted, that there was a kind of communal relationship that he had with that person...” (Interview 7 2013)

By now it should be clear that there are a number of significant barriers preventing miners from even attempting to become certified. Those that do decide to try likewise struggle. Based on the interviews, it appears that the difficulties miners encounter again vary somewhat by continent. In South America – where the FT/FM Standard dominates – miners find it particularly hard to comply with the organizational and administrative requirements of the standard. In many of the communities – and at times also in the national cultures surrounding them – it is customary to seal business arrangements with a handshake and a verbal agreement. As a result, the concept of keeping meticulously written records is quite foreign to them and seems to many miners to be too arduous (Interview 3 2013). Furthermore, the FT/FM standard imposes strict rules on how miners have to be organized (see ARM 2012 for details). This causes problems for two reasons: first, because in many cases, while it may not be obvious to an outside observer, the miners are in fact quite organized already according to their own set of rules (Interview 7 2013). While these may not be as democratic or as all-inclusive as development workers would like, they are firmly rooted in the cul-

ture and difficult to alter, especially when it comes to asking miners of different ethnic or cultural backgrounds to work together against their will.²³ The second reason these organizational requirements are difficult for miners is that they require a large degree of management and leadership skills as well as a thorough understanding of the certification standard. In some of the currently FT/FM certified mines in South America, the bylaws limit the term of a member of the board of directors to two years – a measure that is intended as a check on power and foundation for democracy. However, according to ARM, it often takes close to a year until the new set of leaders has sufficiently familiarized themselves with the FT/FM standard to truly be able to carry out their responsibilities (Interview 3 2013). Evidently this frequent change in leadership and steep learning curve leads to great inefficiencies. Finally, many of the miners quite understandably have the attitude that it is their job to earn money mining gold and not to manage an organization (Interview 3 2013).

7.1.3 Institutional Prerequisites for Success

While experts agreed that there are few hard and fast institutional prerequisites that must be met in order for a certification scheme to achieve success, there are a number of conditions that significantly improve its chances. The only requirement that is absolutely necessary is, as was already discussed at length above, the legality of ASM in the country in question. If this requirement is not fulfilled, certification based on physical traceability is simply impossible (Interview 3 2013). Along similar lines, most experts agreed that it is important to work in cooperation with the government in the country where certification should take place and that it is key for officials to recognize the potential of ASM as a valuable opportunity and livelihood activity (Interview 6 2013). Among other things, this requires an ongoing two-way dialogue and the assurance that those government representatives responsible for mining understand the premise and intentions of certification (Interview 5 2013). On the political front, several experts also highlighted the importance of good governance and functioning state structures (Interview 2 2013; Interview 5 2013), which are necessary to help ensure the integrity of the entire supply-chain from beginning to end and prevent corruption along the way (Interview 6 2013). Obviously it is much harder

²³ This is also one major reason why some of the experts think the FT/FM standard cannot be implemented in Sub-Saharan Africa in its current form (Interview 7 2013).

to comply with these conditions in the presence of armed conflict, thus certification can succeed much more easily in times of peace.

From an economic standpoint, the key issue to consider is the nation's trade and export laws. Particularly under the FT/FM standard, producers must be able to sell their ore directly to customers outside of the country. In some countries, the state or a national bank holds a monopoly on gold exports, making it impossible to build up an alternative supply-chain such as the Fairtrade system (Interview 3 2013).

While much of the certification process takes place in and is dependent on the situation in the home country of producers, there are also economic prerequisites in the target market. More specifically, there has to be a demand for certified products. In the case of tin, tantalite and tungsten, the three metals certified by the CTC scheme, demand was essentially created through the introduction of the Dodd-Frank Act and its Section 1502, requiring proof of conflict-free origin. Nevertheless, most companies in industrialized countries seem to purchase certified resources only insofar as they are obligated to do so by law and fail to see themselves as obligated to advocate for an improvement of conditions in the ASM sector beyond fulfilling their legal duties (Interview 2 2013). However, the story is quite different for FT/FM gold. To date, a little over a year after the first mines were certified, demand is still a significant problem. While it was obvious that the market would not boom overnight, interest in the purchase of certified gold is much lower than was originally expected (Interview 3 2013). Retailers have found that certification is not a primary criterion for most customers (Interview 1 2013; Interview 6 2013) and moreover, that the price difference between FT/FM and conventional gold is significant enough to act as a deterrent to the purchase for anyone who is not absolutely set on purchasing certified gold (Interview 6 2013; Interview 7 2013). Consequently, while three major UK retailers were willing to introduce FT/FM gold to their collections as a trial, all three stores failed in this endeavor and abandoned the experiment after only six months (Interview 6 2013). Among those experts familiar with the FT/FM standard, there was universal agreement that the FLO has not yet done enough to market its newest addition to the Fairtrade system – whether in terms of adver-

tising campaigns or in introducing the certification label to more target countries²⁴ (Interview 1 2013; Interview 3 2013; Interview 6 2013; Interview 7 2013).

Related to marketing is the issue of complexity. One retailer emphasized that it is quite difficult to convey to people the meaning of certified gold, especially because there are multiple standards on the market (Interview 1 2013). On the same note, both retailers stressed the importance of keeping certified gold pure. There had been discussions during ARM's review of the FT/FM standard about whether to introduce mass balancing, where the label would certify that a certain percentage of the gold had been produced fairly, but not necessarily all of it. This proposal was met with outrage and a petition against its implementation initiated by the organizations Ethical Metalsmiths, Fair Jewelry Action USA, and Fair Jewellery Action UK and signed by jewelers around the world (Interview 1 2013). In its Review of the first Round of Consultation, ARM described this issue as being "the most commented on with many expressing concern" (ARM 2013b).

7.1.4 Appropriateness of Certification Requirements

Experts were asked what percentage of small-scale miners they thought could currently meet the requirements of the major standards. In response to this question, everyone agreed that the answer is different for South America than for Sub-Saharan Africa and furthermore, that a distinction must be drawn between different standards. With regards to Certified Trading Chains, most of the pilot mines in Rwanda were able to meet the requirements a year after the initial audit and with the support provided through the program. However, both the level of detail in the initial audit and the amount of support given during the pilot phase were greater than they would be during the regular application of the standard. Moreover, even under the conditions of the pilot phase, most of the other 3000 small-scale mines in Rwanda and the DRC would not be able to meet the requirements to become CTC-certified (Interview 2 2013; Interview 4 2013). The lower-level RCM standard may be a somewhat more realistic goal, though anything even close to universal compliance is highly unlikely.

²⁴ As of this writing, FT/FM gold is only commercially available in the UK and the Netherlands, though there is an individual who imports certified gold from the UK to Germany by special order from German jewelers (Interview 1 2013; Interview 3 2013).

All experts – even including the ARM Standards Coordinator – agree that the FT/FM standard is currently accessible only to “the top of the pyramid,” encompassing a very small percentage of small-scale miners (Interview 3 2013). At least in the eyes of ARM, this is clearly a point of significant concern. In the short-term, a scoping study ordered by the organization showed that approximately 20-30 ASM organizations in Peru, Colombia and Bolivia could reach certification within the next one to three years, provided they receive enough assistance from Producer Support Organizations during that time. As a more long-term goal, the FLO and ARM hope to supply 5% (ca. 200 tons) of the global jewelry production with FT/FM gold within the next twenty years. This would require certifying approximately 30% of small-scale gold miners world-wide, a goal that seems unrealistically optimistic given the standard’s experiences thus far (Interview 3 2013).

All of this then raises the question of whether the requirements of these certification standards can be considered to be reasonable. This is the first major point where opinions differ. On the one hand, there are those experts who feel that the standards are simply “ridiculous, out-of-touch with reality,” allowing only a very small group of miners – and arguably those who need it the least – to reach certification (Interview 7 2013). “[T]hose standards were developed on the back of a very unique set of operations in Latin America” and will only lead to elite capture when implemented as they stand now (Interview 7 2013). According to one expert, it is only due to the “laziness of development” that the FT/FM standard is based on a setup that is already working, even though this is a thoroughly inappropriate foundation for a more universal standard (Interview 7 2013). ARM itself considers the complexity of its standards a sore spot and internal discussions are ongoing about possible alternatives (see section 8 for more detail) (Interview 3 2013). The BGR, having somewhat less of a development focus, is generally more concerned with providing companies with a reliable source of conflict-free and sustainable natural resources and less so about the accessibility of its standards to small-scale miners (Interview 2 2013).

On the other hand, from the point of view of retailers, it is only by setting the benchmark very high that certifiers can prevent a devaluation of their standards (Interview 1 2013; Interview 6 2013). Given that the reputation of a certification standard is its single most valuable asset, this is an important perspective to consider, especially in the case of FT/FM, whose standing also has an impact on all other Fairtrade certified goods. Ultimately, there is a conflict between making standards accessible – for the sake of driving forward development in the ASM sector and reaching a larger number of miners – and keeping the re-

quirements high in order to reserve certification for those who have truly made significant progress in improving the conditions of their operation.

7.1.5 Is certification an effective approach to development and/or poverty-reduction?

During this entire discussion, it is important to keep in mind what certification can and cannot do: it is unrealistic to think that it could, for example, single-handedly end the conflict in the Democratic Republic of the Congo (Interview 2 2013) or suddenly conjure up a set of utopian conditions that simply do not exist (Interview 4 2013). To expect these accomplishments of any standard is to doom it to failure before it has even begun being implemented. Consequently, in spite of the many problems that were discussed during the interviews, experts were asked whether they would consider certification an effective approach to development and/or poverty-reduction. Of the five interviewees who responded to this question, one tended towards no and the other four gave conditional answers of yes.

In the case of the negative answer, there were two general objections to using certification as a concerted development approach. First, the expert considered it to simply be inefficient as such (Interview 4 2013). Implementing a certification scheme requires a tremendous amount of work, from establishing the criteria that need to be met to performing ongoing and annually repeated audits. Given this much effort, the result in terms of development success is not high enough to justify the investment. Furthermore, there was concern that the focus on meeting certification requirements right now might overshadow the need for more fundamental efforts (Interview 4 2013), like working towards legalization in all countries or developing more environmentally sound methods of production, which are necessary in order for certification to become a realistic option for the ASM sector.

The other four experts all agreed that it is *an* approach to development, though perhaps not the best or most efficient (Interview 5 2013). One argued that it can aid other development efforts by improving organization and income and furthering in-country processing steps, thereby enabling other forms of progress to take place more easily (Interview 2 2013). A similar opinion was voiced by another expert, who felt that it can serve to complement other projects and particularly fill in the financial gap left by reduced official development assistance (ODA) contributions (Interview 3 2013). Certification can also help bring atten-

tion to where problems lie so that they can be addressed (Interview 2 2013). Some standards, particularly FT/FM, make a significant effort to include small-scale miners in decision-making and standard design, treating them not only as one stakeholder group, but the primary stakeholders. Consequently, the system is a less paternalistic approach to development than more traditional projects and can thereby further empowerment in the ASM sector (Interview 3 2013). Nevertheless, according to several experts, there also have to be clear incentives – financial or in-kind, for example in the form of trainings and capacity building – in order for certification to contribute towards improvements in small-scale mining (Interview 3 2013; Interview 6 2013).

7.2 Theory-based Evaluation of Current Status

The central question that has guided this paper from the beginning is whether certification as a mechanism is suitable to the development of the artisanal and small-scale mining sector. To this end, Chapter 6 described in detail the theoretical foundations of certification systems and Section 7.1 provided an in-depth look at the current status of certification in the ASM sector based on seven expert interviews. This section will now combine those insights by evaluating the progress that has been made in the sector to date.

7.2.1 Private Governance Theory

Figure 5 indicated how the mechanisms of Private Governance Theory and Principal-Agent Theory are manifested in certification. In the case of the former theory, there are three separate functions described by Pattberg: the regulative function, the integrative function, and the cognitive/discursive function. The certification standards in the ASM sector certainly fulfill the first of these three tasks: every standard creates a set of rules that must be followed in order for miners to be certified. In contemplating the impact of this function, Pattberg had stated that “[p]ossible effects include changes in markets and economic incentive structures, environmental improvements or deterioration and impacts on social parameters such as working conditions and labour rights” (Pattberg 2006, 582). A change in incentives certainly takes place with the FT/FM standard, which attracts miners’ attention with the payment of a Fairtrade and Green Premium, depending on their level of compliance. The CTC standard offers less obvious rewards by guaranteeing fair market-based prices, but no premium. However, given the impact of the Dodd-Frank Act on the ASM sector in the Great Lakes Region, CTC and the related RCM may provide the only way for

miners to continue earning a living through small-scale mining and thus certification indirectly provides a very significant incentive. Insofar as standards eliminate middlemen from the supply-chain and thus institute a completely separate alternative trade route for ore, the structure and dynamics of the natural resource market change significantly, impacting far more than just the sale of gold or other ASM metals. As explained above, the middlemen often serve functions other than that of go-between and so far it is unclear how their removal from the system would be compensated. Certainly, it is unrealistic to expect that those governments that have failed to provide essential services like credit and insurance to miners in the past would suddenly start to do so just because mines have now been certified. Nor do these tasks fall within the purview of certifiers, who moreover simply do not have the capacities to cover these needs. Thus, while certification complies with its regulative function of rule-setting, compliance with these rules can create new problems that do not yet have an easy solution.

In terms of the improvement of environmental and social conditions through certification, it has to be noted that this expectation is somewhat tautological: miners can only be certified if they succeed in improving these conditions,²⁵ which means that becoming certified automatically implies that the environmental and social conditions are better than they were before.

While certification standards in the ASM sector clearly fulfill the regulative function described by Pattberg, it became clear from the interviews that only a tiny fraction of artisanal miners are currently able to meet the requirements. The question must therefore be posed whether it is reasonable to create standards that are so high as to be unreachable for the majority of the possible participants. Opinions vary, though it is worth noting from a theoretical perspective that the mere creation of rules does not automatically lead to an improvement.

Looking at the integrative function of certification, examples can be found where both aspects of it have been fulfilled. For example, the FT/FM standard incorporates definitions of child labor and other working conditions furnished by the ILO; the Green Premium section will comply with the UN's mercury ban (the Minamata Convention) once it is implemented ("Minamata Convention Agreed by Nations - UNEP" 2013). This is an example of how certification can create "functional spaces wherein [international regulations] become enforceable"

²⁵ Following the assumption that some of the mines in question did not meet those standards already, given that if they all did, the entire discussion would be moot.

when otherwise they often are not (Pattberg 2006, 590). The reverse effect, where nations adopt rules found in certification as their own national regulation has taken place in Rwanda, which has made compliance with the ICGLR's Regional Certification Mechanism mandatory for the ASM sector – though fulfillment of this requirement is far from universal to date (Interview 2 2013).

Another interpretation of the integrative function might be the achievement of legalization of ASM in those countries where the sector is still officially unauthorized. One means towards reaching this goal is through political representation and lobbying of the interests of small-scale miners on an international level, a task that the ARM already considers one of its priorities (Interview 3 2013).

When considering the degree to which current certification programs have fulfilled the cognitive/discursive function, it is important to bear in mind how little time has passed since the implementation of these standards. Given the small number of mines that have been certified to date, it is clear that the network created by ASM certification systems is nowhere near the size or functionality of the network created by the Forest Stewardship Council which Pattberg had analyzed. On the other hand, at least the FT/FM standard has led to some connectivity between ASM miners through its first review of standards. As part of this process, ARM organized a series of workshops throughout 2012 which included representatives from ASM organizations, NGOs, jewelers' organizations, and a number of ASM experts (ARM 2013a). While the CTC approach does not seem to have linked any miners with each other, it did connect a number of organizations: the ICGLR's Regional Certification Mechanism will incorporate aspects of the BGR's CTC and iTSCi's ITRI. If the RCM is implemented in member states other than Rwanda, some of the countries may be able to learn from their neighbors' experiences.

To expand Pattberg's analysis a little further, one could also argue that it is part of the discursive function of certification to raise awareness among consumers of the problems the standard is trying to address. The BGR considers the mobilization of resources and the generation of more input from the industry side as key aspects of its certification program (Interview 2 2013). As was already discussed above, the FLO – in charge of marketing and awareness-raising in its partnership with the ARM – is seen from the outside as having fallen behind too far in its work with regards to the FT/FM standard (Interview 3 2013; Interview 6 2013). Since the model of certification relies on consumers' purchasing decisions as its driving force, this is a serious short-coming of that particular pro-

gram. Without addressing this problem, the standard will likely fail in its endeavor.

7.2.2 Property Rights Theory

Sections 6.2.1, 7.1.2, and 7.1.3 made the value of private property to the ASM sector and its certification quite clear. While the legal status of ASM is not the direct responsibility of certifying organizations, their efforts will be seriously hampered as long as small-scale miners cannot or do not carry out their work legally. Many of the interviews highlighted that there is a long way to go on this front and that it has to be on top of the list of priorities. The reports from those South American miners that have already been certified, who stated that they have enjoyed an increase in prestige both in their social and governmental interactions as a result, provides hope that an increase in certified mines will also bring about an increase in the willingness of governments to view ASM as a profitable livelihood opportunity for their citizens. However, it will likely take many more certifications than are currently in place to make this change possible.

7.2.3 Principal-Agent Theory

Principal-Agent Theory provides solutions to mitigate the uncertainty that arises as a result of the information asymmetry between principals and agents in a transaction. As already described in detail in Section 6.2.2, there are two sets of principal-agent pairings in the case of ASM certifications: certifying organization/ASM organization and buyer/seller. In the first pairing, there were three ways to deal with the potential *ex-post* problems of the transaction: monitoring, reporting and incentive-setting. It is unclear whether there is a reporting mechanism in the certified trading chains system, but other than that both certification systems made use of all possible solutions. Both schemes involve regular audits, generally once per year, which serve the function of monitoring the compliance of ASM organizations with the certifying standards. In the case of the CTC, the ICGLR is still in the process of hiring an Independent Mineral Chain Auditor (IMCA), whose function will be to provide additional audits in all of the countries that employ the RCM, so as to monitor not only the compliance of the mines, but also that of the individual national certifying boards (Interview 1 2013). With regards to FT/FM, some miners raised concerns at the workshops in 2012 that the auditors from FLO-CERT may not be familiar enough with the

dynamics of the ASM sector (Interview 3 2013), although others specifically complemented the outstanding job they have done to date (Interview 6 2013).

The FT/FM system also stipulates that all ASM organizations have to keep regular records about their employees, their finances and other aspects of their everyday work. These records are among the elements that are inspected during audits and thus can be regarded as a type of reporting mechanism that happens on a more regular basis throughout the year. Thus, monitoring and reporting complement each other: while direct monitoring by an auditor may be more 'reliable,' in the sense that the auditor is an independent outsider who is expected to conduct an objective inspection, it happens only very infrequently. Reporting, on the other hand, is more at risk of being exaggerated or falsified, but in turn takes place continuously.

Since the role of incentives in the two systems has already been discussed in Section 7.2.1, it will not be repeated here except to say that both CTC and FT/FM certification employ incentives, albeit to somewhat different degrees.

While the transactions that have been evaluated so far have all taken place at the very beginning (producer end) of the supply-chain, the *ex-ante* problems are instead located at the other end of the chain, in the sale of the good to a customer.²⁶ Screening and signaling, the two options for resolving the *ex-ante* problems, happen simultaneously when it comes to certification and simply describe the process from two separate points of view. The customer screens products for their credence quality – in this case the conditions under which the metal was extracted from the ground – based on the presence of a label on a product. The seller, on the other hand, uses the same label to signal this information to the customer.

Since low demand is still a significant problem, particularly for certified gold, there was quite a bit of discussion during the interviews regarding this end of the supply chain. On the one hand, a number of experts pointed out that many customers – insofar as credence quality is even relevant to them – are easily satisfied. If they see a label on a product, they often do not bother to ask what exactly is being certified (Interview 1 2013; Interview 7 2013). This can at times lead to exploitation of the consumers' naïveté:

²⁶ For the sake of simplicity, only the final sale of a product to the end-consumer will be considered here, although every other sale along the supply chain between supplier and purchaser can be analyzed in the same way.

"If we can purchase something that's fairly reasonably priced, that's helped a family get out of poverty, we will do that. We will make that purchase. But as companies and organizations, we know that that's the way that consumers think and [...] we'll just [...] do the bare minimum and know that the consumer is satisfied. And this is where the stupid part comes in: the consumer rarely questions what he or she is buying" (Interview 7 2013).

On the other hand, at times it was precisely the same experts who stated that the great plurality of different labels and standards which all employ similar terminology, but certify different conditions or approaches, makes it difficult for both producers and consumers to keep an overview in the 'jungle' of available standards. A similar argument inspired the strong objection of several jewelry organization to the proposal of mass balancing FT/FM gold: how does one explain to a customer that 30% of their wedding ring was produced under socially and environmentally acceptable conditions, whereas the remaining 70% may very well have involved environmental pollution, child labor or the payment of no more than starvation wages (Interview 1 2013; Interview 6 2013; Interview 7 2013)?

7.2.4 Transaction Cost Theory

Since the application of Transaction Cost Theory to certification in the ASM sector was already analyzed in great detail in Section 6.2.3, it will not be repeated here. Suffice it to say that by signaling to a buyer (in this case a retailer purchasing gold or one of the 3T metals) that a particular quantity of that metal meets certain standards, transaction costs are significantly reduced, whether on the market or in the context of a hybrid contract. However, because demand for certified gold is still quite low and the frequency of transactions is difficult to predict, the commitment of a hybrid contract is not attractive enough yet to most retailers. As a result, most FT/FM gold continues to be sold through regular competition processes on the free market.

Given the political situation in the Great Lakes Region and the conflict-free requirements of the Dodd-Frank Act, companies have little choice but to either purchase certified metal or acquire their resources from somewhere outside of that region. This of course changes the dynamics of the entire market and makes certification less of a unique selling point and more of a necessity for (legal) sales. Consequently, there is likely to be little incentive for retailers to create hybrid governance contracts with specific producers: if metals from the Great Lakes Region are too expensive, they can simply look for resources from

other parts of the world on the open market which are automatically considered to be conflict-free.

7.3 Evaluation of hypotheses

While all of the interviewed experts rely on different sets of experiences and, at times, expressed opinions that stood in stark contrast to each other, when taken as a whole, their views seem to confirm all three hypotheses set at the beginning of this project to a large degree.

Hypothesis 1:

Unless the certification process is coupled with other development measures, as well as an appropriate institutional environment, only a small subset of the problems from the ASM-sector can be resolved by it.

Hypothesis 2a:

With regards to the first steps of development, certification schemes simply confirm that development has already taken place and problems have been resolved, rather than actually leading to development.

Since these two hypotheses are very closely linked to each other, they will be discussed together here. To begin analyzing their validity, it is first and foremost important to distinguish between a certification scheme which *leads to* development and a scheme which *certifies* development. Those responsible for the CTC system do not see its primary goal as that of development; rather, they hope that certification may lead to an improvement of conditions as one of a number of effects.

Consequently, this section will focus its attention primarily on the Fairtrade and Fairmined Standard, which exemplifies the theory described in Hypothesis 2a: by the time all the necessary requirements have been fulfilled and certification has been reached, a significant amount of development has already taken place. But looking at the working mechanisms of certification that were analyzed in Section 7.2 (Private Governance Theory, Property Rights Theory, Principal-Agent Theory and Transaction Cost Theory), none of those instruments intrinsically lead to development or the improvement of political, environmental and social conditions.

This is a distinction that is rarely made explicit. On the Fairtrade website, for example, the FT/FM standard is described as follows:

Jewellery with the Fairtrade and Fairmined gold stamp is extra special. Buying it means you know the small-scale and artisanal miners were paid a fair price, giving them financial security. They also receive an extra amount of money to invest in building the future of their families and their communities, through education, medical care or environmental projects (“The Fairtrade Foundation | Fairtrade” 2013).

While the first statement about the payment of a fair price is true, the second assertion is not false, but certainly misleading. It seems to suggest that the improvement of conditions in ASM communities is being held back solely by a lack of money. However, just handing people extra money and telling them to develop their communities and address all of their problems with it is simply not good enough. As stated by one of the experts:

"I don't think if you [...] get these guys a better price [...] things would necessarily improve. There's so much more that needs to be done in terms of improving standards of living [...] in this sector. We assume too many things in development. We assume trickle-down and when we implement these big projects we assume that the industries we finance the development of will catalyze the growth of other industries, [but] there's too many assumptions being made and we can't make the same mistake that if we give [miners] a better price for their gold, then that will lead to more productive spending [, ...] you have to have [...] other things in place as well" (Interview 7 2013).

This is not to say that the FT/FM scheme cannot lead to development. While the need for additional support will be addressed in greater detail under Hypothesis 3, the standard is designed to aid ASM communities in their development through cooperation with Producer Support Organizations. Rather, the point that should be emphasized here is one of a more theoretical nature: as soon as certification schemes do more than signal, monitor, incentivize, regulate, and lead to the formation of networks,²⁷ they're not just certification schemes anymore, but rather development projects that include a certification component.

In regards to the remaining points of the two hypotheses, all experts seemed to agree on the importance of an appropriate institutional environment for the success of certification programs. They particularly highlighted the need for government support, the legalization of ASM and trade laws that enable individuals or organizations to freely export gold.

²⁷ See Principal-Agent Theory (Section 6.2.2) and Private Governance Theory (Section 6.1).

As for the small subset of problems that could be solved by certification without it being coupled with development measures, there are two lines of arguments that show that not even these can be solved at present, making this part of the hypothesis false. First, if miners are unable to reach certification, which is currently the case for the overwhelming majority of artisanal and small-scale mines, certification cannot be said to resolve any of their problems. Secondly, there are a number of problems that should in fact be addressed by certification directly. Particularly key examples are market access and the receipt of fair world-market-based prices. Here, it must be noted that FT/FM certification achieves these *insofar as miners are able to sell their gold under FT/FM terms*. However, it appears that many of the mining organizations that are currently certified by the standard have still been forced to sell the majority of their gold under conventional terms, since demand for certified gold is simply too low. The largest Fairtrade Jeweler in the UK, CRED Jewellery,²⁸ has purchased a total of 20kg of certified gold from the five FT/FM mines over the course of two years, whereas there is over 100kg of certified gold available *per month* (Interview 6 2013). Consequently, certification will only be able to resolve market-related problems if demand among consumers in developed countries rises significantly. To summarize, Hypothesis 1 is mostly valid, though it is questionable to what degree certification mechanisms can resolve problems if they are not connected to some type of development effort. Hypothesis 2a holds true.

Hypothesis 2b:

At more advanced stages, certification can contribute to development and make that which has already taken place more sustainable.

Due to the fact that certification schemes in the ASM sector are still so young and mines at more advanced stages of development are hard to find, it is difficult to judge the validity of this hypothesis on anything but a theoretical level. From that perspective, it can be said that if demand is high enough that mines are actually able to sell their ore under the terms of FT/FM, it is likely that the advancements that were made to become certified will be sustained. Given the higher income of the FT Premium, there is a significant incentive for miners to retain certification, and once the necessary improvements have been made, it is

²⁸ According to the owner of CRED, there are 51 FT/FM retailer licensees in the UK. His company sells 65% of FT/FM gold, whereas the remaining 50 licensees sell 35% (Interview 6 2013).

far easier to maintain those standards than it will have been to reach them initially.

Whether certification can contribute to further development is, again, a question of how the additional money is spent. However, as was noted earlier, miners have also experienced an increase in prestige, and it is probable that both individual mines or miners and the sector as a whole would benefit from an improved reputation.

Hypothesis 3:

Certification schemes can only lead to a change in behavior if the requirements are realistically achievable in a foreseeable future for those who do not yet meet them. Thus, it is essential to have an extensive support system to help producers who are not yet certified reach levels of development necessary to become certified.

This hypothesis can more easily be verified. If certification schemes only certify those people who already meet a certain set of criteria, they do not lead to a change in behavior. In order to incentivize such a change – and with it development – the requirements need to be formulated in such a way as to be feasible for those who do not yet meet them. What does it mean in this context for requirements to be ‘realistically achievable in a foreseeable future’? First, what is being asked of small-scale miners should be culturally appropriate and applicable to their local conditions. This means, for example, that the elimination of child labor may need to be differentiated a bit further for Sub-Saharan Africa (Interview 7 2013). Does asking children to get water or cook food for miners qualify as child labor just as much as requiring them to squeeze through tight openings at the end of a long mining shaft? Perhaps not, especially considering the context that, without their help, parents may not be able to earn enough money to provide food for their children, or that ‘AIDS orphans’ may end up on the street if they are not allowed to participate in any way in ASM. Certainly, there need to be tighter safety standards and minimum age requirements for specific activities, but simply imposing the ILO’s child labor definitions and requirements onto the ASM sector in Sub-Saharan Africa without any type of adaptation may not be doing children a favor (International Labour Organization (ILO) 2005).

Second, the foreseeable future for artisanal miners, some of whom have to ask themselves on a daily basis where their next meal will come from, is much shorter than it might be for a large corporation. Anything over a maximum of

one or two years is likely to fall outside of that range, whereby shorter time horizons that can be measured in months are preferable. The first half of Hypothesis 3 thus appears to be true.

As regards the second half of the hypothesis, it is well supported by the experiences detailed above – particularly in Sections 7.1.2 and 7.1.4. Given the level of expectations of the standard and the difficulties miners have in meeting them, the support that is currently being provided seems inadequate. ARM’s website states that “[b]y building the capacity of local NGO’s and other support organisations through training of trainers programs, ARM seeks to ensure that miners wanting to enter the certification system can find local support, and that the standards are inclusive and context sensitive” (ARM 2010). However, when asked about the role of Producer Support Organizations, ARM’s representative explained that these are generally local organizations that are interested in and willing to provide support to small-scale miners in achieving certification (Interview 3 2013). But there is no concrete plan for how this work is financed – ARM tries to raise money wherever possible, but their resources are limited and the Producer Support Organizations seem mostly to be left to their own devices as far as financing is concerned (Interview 3 2013). Moreover, if no local organization is interested, the role of Producer Support Organization simply remains unfilled. This cannot be considered a sustainable model of development.

8 Recommendations

It is clear that there is a long way to go before all of the problems that accompany certification in the ASM sector have been resolved. In this section, I offer a few recommendations based on the information gathered through both my literature review and the interviews with experts in the field of ASM.

There are a number of issues that are beyond the control of both small-scale miners and certifying organizations – the most obvious example is the threat and disruption of armed conflict in mining countries, especially in the DRC. However, this does not mean that they are simply powerless. There are a few problems that can at the very least be influenced, if not resolved, by their efforts. Some are internal, meaning that they pertain to the standard and its implementation, whereas others are external, involving interactions outside the realm of the standard. The two most important internal recommendations are the creation of a progressive certification system and the provision of significantly more support to small-scale miners in the process of fulfilling the necessary requirements.

While there are some concerns that the confusion ensuing both among producers and consumers as a result of adding yet another standard to the mix would cause more harm than good (Interview 1 2013; Interview 6 2013), I believe it is essential that certification become available to a larger subset of artisanal and small-scale miners. Only by including more ASM organizations is it possible to maximize the benefits available from certification. For example, it was evident from the interviews that the low demand for certified gold is a big problem. However, if certifiers now start a large-scale marketing campaign – more on this recommendation later on – and successfully raise demand, they also need to be able to quickly increase supply. With a total of nine mines around the world currently enjoying certification (counting only those mines that carry a FT/FM or CTC label), it will be impossible to service the much higher demand that could result from a successful awareness-raising and advertising campaign.

From a less commercial perspective, the idea behind certification – at least the type provided by ARM and the FLO – is to improve the living standards of small-scale miners. But if all of those who suffer from the worst conditions are left out of certification because they cannot meet the standards, this goal cannot be achieved. I would therefore like to recommend a solution that is already being discussed internally by the Alliance for Responsible Mining: creating a second, parallel standard to the current FT/FM standard that acts as a feeder system for

the actual FT/FM certification (Interview 3 2013). This parallel standard would feature multiple stages with progressively more advanced requirements, the highest level of which would qualify miners to become certified under the FT/FM standard. Options for incentivizing the progress through this feeder standard include in-kind donations or greater access to training, capacity building, etc. The financial rewards in form of the FT Premium would continue to be reserved for those miners who reach full FT/FM certification, thus providing a significant incentive for them to continue all the way through the entire process. Which requirements would be appropriate for each stage, how long miners have to move on to the next stage and other such details would need to be adjusted to the local context. This would also allow for the standards to be more appropriate to the varying geography of ASM landscapes and prevent, as was lamented by one expert, the situation where “almost by default, the systems that don’t need any help or support become the standard” (Interview 7 2013). To address the marketing concerns associated with the introduction of yet another different standard, it would be advisable for FT/FM to consider markets other than that of jewelry. Producers of many electronic goods or the financial industry also have a considerable demand for gold and would likely struggle less with a complex certification system than a customer for whom the purchase of a piece of jewelry is a one-time event.

A key prerequisite for miners to succeed in either of these systems is that they receive more support. While there may be some small-scale miners who already work under ‘almost acceptable’ conditions and only have a short way to go, a large number of artisanal miners work in truly horrendous situations and are a very long way off from meeting even a single one of the requirements of the CTC or FT/FM certificate. It is unrealistic to demand that these individuals make all of the necessary changes to meet the legal, labor, social, organizational, and environmental expectations by themselves. To truly make a difference in this sector, a reliable, long-term source of financing is necessary that can cover the costs of advising and guiding artisanal miners from the first decision to embark on the path towards certification to the formation of democratic organizations, legalization and the acquisition of mining licenses, to improving social and environmental working conditions.

Accepting that small-scale miners are in need of help to improve their standard of living requires understanding that they are not, in fact, doing this voluntarily. As was said at the beginning of this paper, ASM is a poverty-driven activity. Those that work in this industry on a long-term or permanent basis do so because they see no other alternative to feed themselves and their families. In

terms of recommendations on an external level, this means that governments in mining countries need to finally learn to see this sector as one that can generate income and job opportunities and thereby make a substantial contribution to the development of their country. But in order for this equation to work out, small-scale miners must be able to work legally – which also implies *being allowed to pay taxes* – and have access to the land that is mineral-rich but will not be mined by large-scale mining corporations. From the point of view of the certifying organizations, this means increasing their lobbying activities and continuously engaging government officials and representatives from the LSM sector in dialogue to work out acceptable compromises for the ASM sector which involve the “appropriate distribution of land resources or [the] distribution of appropriate land resources” (Interview 7 2013).

The final external recommendation, already touched on earlier, is that marketing and awareness-raising in target markets need to increase. Neither the BGR nor the ICGLR have any visible advertising for their standards to this point. ARM and the FLO have some available materials, particularly over their websites, but these only reach those people who consciously search for information about ethically sourced gold. But it is the population at large, those people who do not automatically think about where their consumer goods come from, who need to become aware of the fact that there is a problem and an available solution.

Finally, it is important to remember why resources are being certified in the first place: it is not, in fact, to make the lives of consumers easier, but to improve the conditions of production in the countries of origin. Which is why, as was noted by one expert, ASM certification “needs good stories. It needs good examples of how it has worked in order to [...] pick up critical momentum to make it something which [...] stays” (Interview 5 2013). ASM needs to finally become visible, not only where it takes place, but all over the world.

9 Bibliography

- ARM. 2010. "ARM: Producer Support." <http://communitymining.org/index.php/en/producer-support>.
- . 2012. "Standard Version 2.0 (2012) of Fairtrade and Fairmined Standard for Gold from Artisanal and Small-scale Mining, Including Associated Precious Metals (Draft for 1st Consultation Round)". Alliance for Responsible Mining. http://communitymining.org/attachments/273_FTFM-v2-EN_ConsultationRound-1_Doc-2_Standard.doc.
- . 2013a. "List of Participants (1st Round of Consultation)." http://communitymining.org/attachments/283_Annex%201%20-%20List%20of%20consultation%20participants.pdf.
- . 2013b. "Consultation Results Synopsis Information to Stakeholders on the Outcome of the First Round of Consultation". Alliance for Responsible Mining. http://www.communitymining.org/attachments/283_synopsis_results_1st_consultation_FTFM2_ENG.pdf.
- Aubynn, Anthony. 2009. "Sustainable Solution or a Marriage of Inconvenience? The Coexistence of Large-scale Mining and Artisanal and Small-scale Mining on the Abooso Goldfields Concession in Western Ghana." *Resources Policy* 34 (1–2) (March): 64–70. doi:10.1016/j.resourpol.2008.04.002.
- Banchirigah, S. M. 2008. "Challenges with Eradicating Illegal Mining in Ghana: A Perspective from the Grassroots." *Resources Policy* 33 (1): 29–38.
- Banchirigah, S. M., and G. Hilson. 2010. "De-agrarianization, Re-agrarianization and Local Economic Development: Re-orientating Livelihoods in African Artisanal Mining Communities." *Policy Sciences* 43 (2): 157–180.
- Behrendt, Siegfried, Michael Scharp, Walter Kahlenborn, Moira Feil, Cornelia Dereje, Raimund Bleischwitz, and Ruth Delzeit. 2007. "Seltene Metalle: Maßnahmen Und Konzepte Zur Lösung Des Problems Konfliktverschärfender Rohstoffausbeutung Am Beispiel Coltan". Dessau.
- Bleischwitz, Raimund, Monika Dittrich, and Chiara Pierdicca. 2012. "Coltan from Central Africa, International Trade and Implications for Any Certification." *Resources Policy* 37 (1) (March): 19–29. doi:10.1016/j.resourpol.2011.12.008.
- Blore, Shawn. 2011. "Implementing Certified Trading Chains (CTC) in Rwanda: Project Review". BGR. http://www.bgr.bund.de/EN/Themen/Min_rohstoffe/CTC/Downloads/CTC-Abschlussbericht.pdf?__blob=publicationFile&v=4.
- Blore, Shawn, and Ian Smillie. 2011. "Taming the Resource Curse: Implementing the ICGLR Certification Mechanism for Conflict-prone Minerals". Other. October 11. <http://dspace.cigilibrary.org/jspui/handle/123456789/32278>.
- BMWi. 2010. "Rohstoffstrategie Der Bundesregierung: Sicherung Einer Nachhaltigen Rohstoffversorgung Deutschlands Mit Nicht-energetischen Mineralischen Rohstoffen." <http://www.bmwi.de/Dateien/BMWi/PDF/rohstoffstrategie-der-bundesregierung>.
- Brooks, William E. 2012. "Mineral Commodity Summaries: Mercury." <http://minerals.usgs.gov/minerals/pubs/commodity/mercury/mcs-2012-mercu.pdf>.
- Burr, Wolfgang. 2004. *Innovationen in Organisationen*. Kohlhammer.
- Cardiff, Scott. 2010. "The Quest for Responsible Small-Scale Gold Mining". EARTHWORKS No Dirty Gold Campaign.

- <http://www.earthworksaction.org/files/publications/Small-scale-gold%20mining-initiatives-comparison-2010.pdf>.
- Childs, John. 2008. "Reforming Small-scale Mining in sub-Saharan Africa: Political and Ideological Challenges to a Fair Trade Gold Initiative." *Resources Policy* 33 (4): 203–209.
- Clausen, F., M. Barreto, and A. Attaran. 2011. "Property Rights Theory and the Reform of Artisanal and Small-Scale Mining in Developing Countries." *Journal of Politics and Law* 4 (1): 15–26.
- De Lacerda, Luiz. 2003. "Updating Global Hg Emissions from Small-scale Gold Mining and Assessing Its Environmental Impacts." *Environmental Geology* 43 (3): 308–314. doi:10.1007/s00254-002-0627-7.
- Demsetz, H. 1967. "Toward a Theory of Property Rights." *The American Economic Review* 57 (2): 347–359.
- Dingwerth, K., and P. Pattberg. 2006. "Was Ist Global Governance?" *Leviathan* 34 (3): 377–399.
- Erlei, Mathias, Martin Leschke, and Dirk Sauerland. 2007. *Neue Institutionenökonomik*. 2. Edition. Schäffer-Poeschel.
- "Fairtrade and Traceability | Fairtrade Canada." 2013. Accessed March 18. <http://fairtrade.ca/en/news-views/news/fairtrade-and-traceability>.
- Falkner, R. 2003. "Private Environmental Governance and International Relations: Exploring the Links." *Global Environmental Politics* 3 (2): 72–87.
- Fisher, E. 2007. "Occupying the Margins: Labour Integration and Social Exclusion in Artisanal Mining in Tanzania." *Development and Change* 38 (4): 735–760.
- . 2008. "Artisanal Gold Mining at the Margins of Mineral Resource Governance: a Case from Tanzania." *Development Southern Africa* 25 (2): 199–213.
- Garrett, N. 2008. "Artisanal Cassiterite Mining and Trade in North Kivu: Implications for Poverty Reduction and Security". CASM. <http://theclaw.typepad.com/files/casmimplications-for-poverty-reduction-and-security.pdf>.
- Geenen, S. 2012a. "A Dangerous Bet: The Challenges of Formalizing Artisanal Mining in the Democratic Republic of Congo." *Resources Policy*. <http://www.sciencedirect.com/science/article/pii/S0301420712000104>.
- . 2012b. "'Who Seeks, Finds': How Artisanal Miners and Traders Benefit from Gold in the Eastern Democratic Republic of Congo." *European Journal of Development Research*. <http://www.palgrave-journals.com/ejdr/journal/vaop/ncurrent/abs/ejdr201219a.html>.
- George, Michael W. 2012. "Mineral Commodity Summaries: Gold". United States Geological Survey. <http://minerals.usgs.gov/minerals/pubs/commodity/gold/mcs-2012-gold.pdf>.
- Gläser, Jochen, and Grit Laudel. 2009. *Experteninterviews Und Qualitative Inhaltsanalyse: Als Instrumente Rekonstruierender Untersuchungen*. 3.Aufl. 2009 ed. VS Verlag für Sozialwissenschaften.
- Global Witness. 2005. *Under-mining Peace: The Explosive Trade in Cassiterite in Eastern RDC*. Global Witness Pub. Incorporated.
- Hainmueller, J., and M. J. Hiscox. 2007. "Being Specific: Measuring Asset Specificity For Political Economy." In *Annual APSA Meeting*.
- Harada, Masazumi, Shigeharu Nakachi, Taketo Cheu, Hirotaka Hamada, Yuko Ono, Toshihide Tsuda, Kohichi Yanagida, Takako Kizaki, and Hideki Ohno. 1999. "Monitoring of Mercury Pollution in Tanzania: Relation Between Head Hair Mercury and Health." *Science of The Total Environment* 227 (2–3) (March 9): 249–256. doi:10.1016/S0048-9697(99)00031-5.

- Hauff, Michael von, and Katja Claus. 2012. *Fair Trade. Ein Konzept Nachhaltigen Handels*. 1. Aufl. UTB, Stuttgart.
- Haufler, V. 2003. "New Forms of Governance: Certification Regimes as Social Regulations of the Global Market." *Meidinger et Al.* (2003): 237–248.
- Heemskerk, Marieke. 2005. "Collecting Data in Artisanal and Small-scale Mining Communities: Measuring Progress Towards More Sustainable Livelihoods." *Natural Resources Forum* 29 (1) (March 14): 82–87. doi:10.1111/j.1477-8947.2005.00114.x.
- Hentschel, T., F. Hruschka, and M. Priester. 2002. "Global Report on Artisanal and Small Scale Mining." *Report Commissioned by the Mining, Minerals and Sustainable Development of the International Institute for Environment and Development*. Download from [Http://www.ied.org/mmsd/mmsd_pdfs/asm_global_report_draft_jan02.pdf](http://www.ied.org/mmsd/mmsd_pdfs/asm_global_report_draft_jan02.pdf) On 20 (08): 2008.
- . 2003. *Artisanal and Small-scale Mining: Challenges and Opportunities*. Iied. http://books.google.com/books?hl=en&lr=&id=kamklwla6acC&oi=fnd&pg=PR7&dq=Artisanal+and+Small-Scale+Mining:+Challenges+and+Opportunities&ots=tPIUfAqYKn&sig=qUYW6nyeqKdCrSgVE_aoTQcYdpA.
- Hilson, Gavin. 2002. "Small-scale Mining and Its Socio-economic Impact in Developing Countries." In *Natural Resources Forum*, 26:3–13. <http://onlinelibrary.wiley.com/doi/10.1111/1477-8947.00002/abstract>.
- . 2006. "Abatement of Mercury Pollution in the Small-scale Gold Mining Industry: Restructuring the Policy and Research Agendas." *Science of the Total Environment* 362 (1): 1–14.
- . 2008a. "'Fair Trade Gold': Antecedents, Prospects and Challenges." *Geoforum* 39 (1): 386–400.
- . 2008b. "'A Load Too Heavy': Critical Reflections on the Child Labor Problem in Africa's Small-scale Mining Sector." *Children and Youth Services Review* 30 (11) (November): 1233–1245. doi:10.1016/j.childyouth.2008.03.008.
- Hilson, Gavin, C. J. Hilson, and S. Pardie. 2007. "Improving Awareness of Mercury Pollution in Small-scale Gold Mining Communities: Challenges and Ways Forward in Rural Ghana." *Environmental Research* 103 (2): 275–287.
- Hilson, Gavin, and S. Pardie. 2006. "Mercury: An Agent of Poverty in Ghana's Small-scale Gold-mining Sector?" *Resources Policy* 31 (2): 106–116.
- Hilson, Gavin, and C. Potter. 2005. "Structural Adjustment and Subsistence Industry: Artisanal Gold Mining in Ghana." *Development and Change* 36 (1): 103–131.
- Hilson, Gavin, and R. Vieira. 2007. "Challenges with Minimising Mercury Pollution in the Small-scale Gold Mining Sector: Experiences from the Guianas." *International Journal of Environmental Health Research* 17 (6): 429–441.
- Hinton, J. J., M. M. Veiga, and A. T. C. Veiga. 2003. "Clean Artisanal Gold Mining: a Utopian Approach?" *Journal of Cleaner Production* 11 (2): 99–115.
- Hogen, Jan. 2012. "Zertifizierung in Der Stadtentwicklung - Eine Institutionenökonomische Und Steuerungstheoretische Betrachtung Der Zertifizierung in Prozessen Der Planung Und Umsetzung Städtebaulicher Projekte Und Maßnahmen Auf Stadtquartiersebene." <https://kluedo.ub.uni-kl.de/frontdoor/index/index/docId/3269>.
- Holloway, J. 1998. "Policies for Artisanal and Small Scale Mining in the Developing World: A Review of the Last Thirty Years." In *Environment and Mining in Eastern and Southern Africa: Selected Papers from an International Conference 23-27th October 1995, Mwanza, Tanzania*, edited by L. Landner. Dar es Salaam University Press.

- Hruschka, F., and C. Echavarría. 2011. "Rock-Solid Chances for Responsible Artisanal Mining" (3). ARM Series on Responsible ASM. http://www.hruschka.com/ASM_course_MUL/library/ARM_-_Rock_solid_chances_for_responsible_ASM.pdf.
- Imparato, N. 2010. "Artisanal Gold and Transformational Exchange: Toward a Public-private Partnership in Tanzania." *Journal of Cleaner Production* 18 (5): 462–470.
- International Labour Organization (ILO). 2005. "Eliminating Child Labour in Mining and Quarrying: Background Document". Geneva. <http://www.ilo.org/public/portugue/region/eurpro/lisbon/pdf/minas.pdf>.
- Interview 1. 2013. "Anonymous" In person.
- Interview 2. 2013. "Dr. Gudrun Franken" In person.
- Interview 3. 2013. "Dr. Felix Hruschka" Skype.
- Interview 4. 2013. "Anonymous" Phone.
- Interview 5. 2013. "Dr. John Childs" Phone.
- Interview 6. 2013. "Alan Frampton" Phone.
- Interview 7. 2013. "Dr. Gavin Hilson" Skype.
- Jennings et al., Norman. 1999. *Social and Labour Issues in Small-scale Mines: Report for Discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines, Geneva, 1999*. Geneva: ILO.
- Jønsson, J. B., P. W. U. Appel, and R. T. Chibunda. 2009. "A Matter of Approach: The Retort's Potential to Reduce Mercury Consumption Within Small-scale Gold Mining Settlements in Tanzania." *Journal of Cleaner Production* 17 (1): 77–86.
- Jønsson, J.B., and Niels Fold. 2011. "Mining 'From Below': Taking Africa's Artisanal Miners Seriously." *Geography Compass* 5 (7): 479–493. doi:10.1111/j.1749-8198.2011.00435.x.
- Lacerda, Luiz Drude De, and Willem Salomons. 1998. *Mercury from Gold and Silver Mining: A Chemical Time Bomb?* Springer.
- Lahiri-Dutt, K. 2004. "Informality in Mineral Resource Management in Asia: Raising Questions Relating to Community Economies and Sustainable Development." In *Natural Resources Forum*, 28:123–132. <http://onlinelibrary.wiley.com/doi/10.1111/j.1477-8947.2004.00079.x/abstract>.
- Levin, Estelle, Cristina Villegas, Ruby Weinberg, Cristina Bueti, Erica Campilongo, John Smiciklas, and Ruediger Kuehr. 2012. "Greening ICT Supply Chains - Survey on Conflict Minerals Due Diligence Initiatives." http://www.itu.int/dms_pub/itu-t/oth/4B/01/T4B010000080001PDFE.pdf.
- Maconachie, R., and G. Hilson. 2011. "Safeguarding Livelihoods or Exacerbating Poverty? Artisanal Mining and Formalization in West Africa." In *Natural Resources Forum*, 35:293–303. <http://onlinelibrary.wiley.com/doi/10.1111/j.1477-8947.2011.01407.x/full>.
- Malm, O. 1998. "Gold Mining as a Source of Mercury Exposure in the Brazilian Amazon." In *Environmental Research*, 77:73–78. Elsevier. <http://cat.inist.fr/?aModele=afficheN&cpsidt=2319590>.
- Mann, Stefan. 2008. "Analysing Fair Trade in Economic Terms." *Journal of Socio-Economics* 37 (5) (October): 2034–2042. doi:10.1016/j.socec.2007.11.002.
- Maponga, O., and C. F. Ngorima. 2003. "Overcoming Environmental Problems in the Gold Panning Sector through Legislation and Education: The Zimbabwean Experience." *Journal of Cleaner Production* 11 (2): 147–157.
- Mayer, Horst O. 2009. *Interview und schriftliche Befragung Entwicklung, Durchführung und Auswertung*. München; Wien: Oldenbourg.

- Ménard, Claude, and Mary M. Shirley. 2008. "Introduction." In *Handbook of New Institutional Economics*, edited by Claude Ménard and Mary M. Shirley, 1–18. Springer. <http://www.springer.com/economics/law+%26+economics/book/978-1-4020-2687-4>.
- "Minamata Convention Agreed by Nations - UNEP." 2013. Accessed March 12. <http://www.unep.org/newscentre/Default.aspx?DocumentID=2702&ArticleID=9373&l=en>.
- Mohammed Banchirigah, S. 2006. "How Have Reforms Fuelled the Expansion of Artisanal Mining? Evidence from sub-Saharan Africa." *Resources Policy* 31 (3): 165–171.
- New Jersey Department of Health and Senior Services. 2006. "Hazardous Substance Fact Sheet: Sodium Cyanide." <http://nj.gov/health/eoh/rtkweb/documents/fs/1693.pdf>.
- _____. 2010. "Hazardous Substance Fact Sheet: Nitric Acid." <http://nj.gov/health/eoh/rtkweb/documents/fs/1356.pdf>.
- Nyame, Frank K., J. Andrew Grant, and Natalia Yakovleva. 2009. "Perspectives on Migration Patterns in Ghana's Mining Industry." *Resources Policy* 34 (1–2) (March): 6–11. doi:10.1016/j.resourpol.2008.05.005.
- OECD. 2011. *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*. Paris: Organisation for Economic Co-operation and Development. <http://www.oecd-ilibrary.org/content/book/9789264111110-en>.
- Ogola, Jason S., Winnie V. Mitullah, and Monica A. Omulo. 2002. "Impact of Gold Mining on the Environment and Human Health: A Case Study in the Migori Gold Belt, Kenya." *Environmental Geochemistry and Health* 24 (2): 141–157. doi:10.1023/A:1014207832471.
- Pact Congo. 2008. "Women in Artisanal Mining in the DRC.pdf." <http://www.pactworld.org/galleries/default-file/Women%20in%20Artisanal%20Mining%20in%20the%20DRC.pdf>.
- Pattberg, Philipp. 2006. "Private Governance and the South: Lessons from Global Forest Politics." *Third World Quarterly* 27 (4) (May): 579–593. doi:10.1080/01436590600720769.
- PERU, *Rinconada: Glacier Gold Parts 1 - 3*. 2009. http://www.youtube.com/watch?v=ku23wS_TctI&feature=youtube_gdata_player, http://www.youtube.com/watch?v=MjNflv1mkgI&feature=youtube_gdata_player, http://www.youtube.com/watch?v=POosyASNQnQ&feature=youtube_gdata_player.
- Pfeiffer, W.C., O. Malm, C.M.M. Souza, L. Drude de Lacerda, E.G. Silveira, and W.R. Bastos. 1991. "Mercury in the Madeira River Ecosystem, Rondônia, Brazil." *Forest Ecology and Management* 38 (3–4) (February): 239–245. doi:10.1016/0378-1127(91)90145-L.
- Pfeiffer, Wolfgang C., Luiz Drude de Lacerda, Olaf Malm, Cristina Maria M. Souza, Ene Gloria da Silveira, and Wanderley R. Bastos. 1989. "Mercury Concentrations in Inland Waters of Gold-mining Areas in Rondônia, Brazil." *Science of The Total Environment* 87–88 (November): 233–240. doi:10.1016/0048-9697(89)90238-6.
- Rametsteiner, E. 2002. "The Role of Governments in Forest Certification—a Normative Analysis Based on New Institutional Economics Theories." *Forest Policy and Economics* 4 (3): 163–173.

- Siegel, Shefa, and Marcello M. Veiga. 2009. "Artisanal and Small-scale Mining as an Extralegal Economy: De Soto and the Redefinition of 'formalization'." *Resources Policy* 34 (1–2) (March): 51–56. doi:10.1016/j.resourpol.2008.02.001.
- Spiegel, S. J. 2009a. "Occupational Health, Mercury Exposure, and Environmental Justice: Learning from Experiences in Tanzania." *American Journal of Public Health* 99 (S3): S550.
- . 2009b. "Socioeconomic Dimensions of Mercury Pollution Abatement: Engaging Artisanal Mining Communities in Sub-Saharan Africa." *Ecological Economics* 68 (12): 3072–3083.
- . 2009c. "Resource Policies and Small-scale Gold Mining in Zimbabwe." *Resources Policy* 34 (1): 39–44.
- "The Fairtrade Foundation | Fairtrade." 2013. Accessed March 14. <http://www.fairtrade.org.uk/gold/>.
- Tschakert, Petra, and Kamini Singha. 2007. "Contaminated Identities: Mercury and Marginalization in Ghana's Artisanal Mining Sector." *Geoforum* 38 (6) (November): 1304–1321. doi:10.1016/j.geoforum.2007.05.002.
- US Department of Labor, Bureau of International Labor Affairs. 2013. "ILAB - Hamisi: Out of the Mine Pits and Back to School in Tanzania." *ILAB - Advancing the Campaign Against Child Labor: Efforts at the Country Level*. Accessed July 3. <http://www.dol.gov/ILAB/media/reports/iclp/Advancing1/html/tanzania.htm>.
- Van Straaten, P. 2000. "Human Exposure to Mercury Due to Small Scale Gold Mining in Northern Tanzania." *Science of The Total Environment* 259 (1–3) (October 2): 45–53. doi:10.1016/S0048-9697(00)00548-9.
- Van Straaten, Peter. 2000. "Mercury Contamination Associated with Small-scale Gold Mining in Tanzania and Zimbabwe." *Science of The Total Environment* 259 (1–3) (October 2): 105–113. doi:10.1016/S0048-9697(00)00553-2.
- Veiga, M. M. 1997. "Mercury in Artisanal Gold Mining in Latin America: Facts, Fantasies and Solutions." In *UNIDO-Expert Group Meeting-Introducing New Technologies for Abatement of Global Mercury Pollution Deriving from Artisanal Gold Mining*, Vienna, Austria. <http://www.globalmercuryproject.org/database/Upload/Global%201997%20Veiga%20Vienna%20%20EGM.pdf>.
- Voigt, Stefan. 2002. *Institutionenökonomik*. UTB.
- Wagner, M., G. Franken, N. Martin, F. Melcher, and J. Vasters. 2007. "Zertifizierte Handelsketten Im Bereich Mineralischer Rohstoffe." *Hannover, Bundesanstalt Für Geowissenschaften*. http://www.genesys-hannover.de/nn_330850/DE/Themen/Min__rohstoffe/Downloads/Studie_Zertifizierte_Handelsketten,templateId=raw,property=publicationFile.pdf/Studie_Zertifizierte_Handelsketten.pdf.
- Werthmann, Katja. 2009. "Working in a Boom-town: Female Perspectives on Gold-mining in Burkina Faso." *Resources Policy* 34 (1–2) (March): 18–23. doi:10.1016/j.resourpol.2008.09.002.
- Williamson, Oliver E. 1975. "Markets and Hierarchies: Analysis and Antitrust Implications: a Study in the Economics of Internal Organization." *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1496220.
- . 1985. "The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting." *New York*.

- . 1998. "Transaction Cost Economics: How It Works; Where It Is Headed." *De Economist* 146 (1) (April 1): 23–58. doi:10.1023/A:1003263908567.
- "Working Together: How Large-scale Mining Can Engage with Artisanal and Small-scale Miners." 2013. Accessed March 22. <http://commdev.org/working-together-how-large-scale-mining-can-engage-artisanal-and-small-scale-miners>.

Annex 1: ASM Problems by Category

	poor governance	disincentive to formalize	inadequate government services	lack of infrastructure	property rights	inadequate legal structure	working conditions	technical problems	inadequate regulation	Lack of knowledge/education	social	information asymmetry	market failure	inadequate enforcement	self-organization
Political Issues															
Governance among producers															X
Governance (government)	X														
Conflict	X														
Mining offices often understaffed, too little money, too few offices/offices too far away				X											
Costs, bureaucracy, corruption, time delays for getting license not worthwhile for small-scale mining		X													
Dependence on middlemen for credit, mercury			X	X											
Legal Issues															
Probability of sanctioning often very low		X													
Land title issues - no farm land due to LSM					X										
Land title issues - no ASM land available due to LSM concessions					X	X									
Insecurity of tenure					X	X									
Mining regulations for ASM often the same as for LSM and thus inappropriate						X									
Economic Issues															

Below-market prices												X	X		
Supply-chain transparency	X								X					X	
Transport/Market access				X											
Smuggling	X												X		
Sudden increase in prices													X		
Agricultural collapse													X		
No access to credit				X									X		
Mining as seasonal activity, supplement to income		X													
Social Issues															
Child labor									X						X
Migration											X				
Marginalization											X				
Health and Safety Issues															
Silicosis (exposure to dust)							X								
Mercury/other chem.								X	X	X					
Noise & vibration							X								
Poor Ventilation							X								
Over-exertion, inadequate work space, inappropriate equipment							X								
No safety equipment							X								
ASM mine audits carried out by questionnaires rather than site visits	X														
Lack of adequate sanitation infrastructure (sewage)				X											
No clean water				X											
Lacking access to care				X											
Prostitution											X				
Spread of HIV/AIDS											X				

Domestic violence (due to mercury exposure)											X				
No separation between home and work place															
Environmental Issues	[Cross-hatched pattern]														
Water Pollution								X	X	X					
Excess use of chemicals								X	X	X					



Authors' affiliations

Miriam Bodenheimer

Fraunhofer Institute for Systems and Innovation Research (Fraunhofer ISI)
Competence Center Sustainability and Infrastructure Systems

Contact: Miriam Bodenheimer

Fraunhofer Institute for Systems
and Innovation Research (Fraunhofer ISI)

Breslauer Strasse 48

76139 Karlsruhe

Germany

Phone: +49 / 721 / 6809-352

Fax: +49 / 721 / 6809-135

E-Mail: miriam.bodenheimer@isi.fraunhofer.de

www.isi.fraunhofer.de

Karlsruhe 2014