

Finnish Attitudes Toward Mining

Citizen Survey – 2016 Results

T. Jartti · T. Litmanen · J. Lacey · K. Moffat



JYVÄSKYLÄN YLIOPISTO
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Acknowledgements

This research was conducted through a partnership between the Department of Social Sciences and Philosophy of the University of Jyväskylä (JYU) and the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO).

This research was funded by the Academy of Finland's research project "*Social license to operate: a real tool or rhetoric? Examining the mining industry in Finland, Australia, and Canada*" (2014-2018) which is a joint project between the University of Eastern Finland (UEF) and the University of Jyväskylä (JYU).

YFI Publications 4

ISBN: 978-951-39-7299-8

ISSN: 2342-3366

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Introduction

The relationship between mining and society is multidimensional and sometimes challenging. Mining provides access to a range of resources that are essential for societal benefit. However, mining must also demonstrate that it has a ‘social licence to operate’ among those communities it operates alongside and with society more broadly.

This report aims to bring the voice of Finland’s citizens, on whose behalf Finland’s mineral resources are managed, into the centre of the national conversation about the role of the mining industry in our society.

Through a joint partnership, the University of Jyväskylä (JYU) and CSIRO were keen to better understand what Finns think about mining. In this study, we have sought to identify how the impacts and benefits of mining, and the relationships between the mining industry, government and society affect the level of acceptance of mining among Finnish citizens.

In short, we have sought to explore what constitutes a ‘social licence to operate’ for mining in Finland.

Understanding the mining industry’s social licence to operate

The mining boom that began in Finland in the first decade of the twenty first century has been marked by a series of often heated public discussions about the impacts of mining. The nature of these public discussions highlighted for social scientists at the University of Jyväskylä (JYU) and at the University of Eastern Finland (UEF) that there was a need to examine public attitudes toward mining in Finland in a more systematic and robust way. This was also because existing research had tended to be fragmented or focused on specific issues such as uranium mining in the context of citizens’ energy political views, for example^{1,2}.

In a joint research project between UEF and JYU (*Finnish mining communities under global transition: Capacities of local responses, 2010-2012*), funded by the Academy of Finland, a survey on Finnish public attitudes toward mining was conducted in 2012 and it was pioneering work in terms of studying broader public attitudes toward mining in Finland³. In this survey, four regions were chosen to reflect Finnish citizen views. Uusimaa represented a growing urban area, whereas North Karelia, Kainuu and Lapland were regions that reflected increasing mining activity for their local populations. The methods established in

-
- 1 Kiljunen, P. (2011). Energia-asenteet 2011. Seurantatutkimustietoa suomalaisten suhtautumisesta energiapolitiittisiin kysymyksiin 1983-2011 [Energy attitudes of the Finns 2011. Follow-up study information on Finns’ perceptions towards energypolitical issues 1983-2011, in Finnish]. Research report. Energiategollisuus ry. Available at: http://www.sci.fi/~yh-dys/eas_11/eas-tied_11.htm.
 - 2 Jartti, T. & Litmanen, T. (2011). Uraanin hyväksyttävyyys. Suomalaisten asennoituminen uraanin, uraanin etsintään ja uraanin louhintaan [The acceptance of uranium. Finns’ attitudes toward uranium, uranium exploration and uranium mining, in Finnish]. *Geographical Journal Terra*, 123 (3), 147–153.
 - 3 Jartti, T., Sairinen, R. & Litmanen, T. (2012). Kaivosteollisuus kansalaisten arvioinnissa: millaisen kaivosalan maakuntien asukkaat haluavat? [Mining industry in citizens’ evaluation: what kind of mining industry do the regions’ citizens want?, in Finnish]. *The Finnish Journal of Rural Policy and Research*, 20 (2), 48–58.

this survey were later adapted for similar national-scale surveys around the world^{4,5}.

This original research on Finnish attitudes toward mining was subsequently extended through a joint (UEF & JYU) research project (*Preconditions and tools for social licence to mine, SoLiMi, 2013-2015*) funded by the Finnish Funding Agency for Innovation (TEKES). This extension of the research focused on conducting a deeper analysis of the survey data collected in 2012 with a specific focus on the attitudinal factors connected to the acceptance of mining and social licence to operate in the geographic focus regions of the survey^{6,7,8}.

Since the initial 2012 survey was conducted, the mining boom in Finland has stabilised. However, we have continued to explore the role of mining in Finland through a current joint (UEF & JYU) research project (*Social licence to operate: a real tool or rhetoric? Examining the mining industry in Finland, Australia, and Canada, 2014-2018, Academy of Finland*). In this current project, JYU has partnered with the Australian national research agency, CSIRO, to conduct an updated national survey on Finnish attitudes toward mining.

This second survey has included a broader, national sample of participants. A comparison of the results from the 2012 and 2016 surveys also allows the temporal changes in the relationship between mining and Finnish society to be observed. This newly updated survey of Finnish attitudes to mining also contributes to the *Citizen Attitudes to Mining (2012-2018)* research program led by CSIRO, which examines the relationship between mining and society at different scales in Finland and internationally⁹.

Mining in Finland: Rapid expansion brought growing pains

Mining activity has a long history in Finland. The first metal mine was the Ojamo iron mine in Lohja (Southern Finland), which was originally founded in the sixteenth century. Much later, the discovery of the Outokumpu copper deposit in 1910 was a cornerstone of Finland's industrialization.¹⁰

Historically the 1990s was a transitional period for the Finnish mining industry as markets opened up to European enterprises when the EEC agreement necessitated an amendment to the Finnish mining legislation in 1994¹¹. However, the actual inrush to Finland of foreign ore prospecting and mining companies only began in 2003–2004 as a result of steep increase in world prices for metals¹². This increase in commodity prices contributed to an intensification of mining activities in Finland at the time. According

- 4 Moffat, K., Zhang, A., Boughen, N. (2014). Australian attitudes toward mining. Citizen survey – 2014 results. CSIRO, Australia.
- 5 Moffat, K., Boughen, N., Zhang, A., Lacey, J., Fleming, D., Uribe, K. (2014). Chilean attitudes toward mining. Citizen survey – 2014 results. CSIRO, Australia.
- 6 Jartti, T., Rantala, R. & Litmanen, T. (2014). Sosiaalisen toimiluvan ehdot ja rajat: Uudenmaan, Pohjois-Karjalan, Kainuun ja Lapin maakuntien asukkaiden näkemykset kaivannaistoiminnan hyväksyttävyydestä [Preconditions and limits of the social licence to operate: views of residents of Uusimaa, North Karelia, Kainuu and Lapland on the acceptability of mining, in Finnish]. SoPhi No. 126, University of Jyväskylä, Jyväskylä. Available at: <https://jyx.jyu.fi/dspace/handle/123456789/44460>.
- 7 Rantala, E., Jartti, T. & Litmanen, T. (2016). Uskomuksista ja oletuksista tutkittuun tietoon: kaivostoiminnan yhteiskunnallisen hyväksyttävyyden kvantitatiivinen tutkiminen [From beliefs and assumptions to researched information: the quantitative research of the social acceptance of mining, in Finnish]. In Mononen, T. & Suopajarvi, L. (Eds.), *Kaivos suomalaisessa yhteiskunnassa* [Mine in the Finnish society]. Lapland University Press, Rovaniemi, 113–134.
- 8 Litmanen, T., Jartti, T., & Rantala, E. (2016). Refining the preconditions of a social licence to operate (SLO): reflections on citizens' attitudes toward mining in two Finnish regions. *The Extractive Industries and Society*, 3 (3), 782–792.
- 9 This multi-country research program is also being extended through the *Global Citizen Voices in Mining* partnership with ICMM and IIED. Available at: <http://www.citizenvoicesinmining.org/>.
- 10 Särkkä, P. & Suomela, P. (2009). Kaivostoiminta. In A. Hakapää & P. Lappalainen (Eds.), *Kaivos- ja louhintatekniikka* [Mining and quarrying technique, in Finnish]. Agency for Education. Vammalan kirjapaino Oy, Vammala, 13–25.
- 11 Lindborg, T. (1996). Suomalaisen kaivosklusterin rakennemuutos [Structural change of the Finnish mining cluster, in Finnish]. *Studies of the Department of Economics* No. 36. University of Oulu, Oulu.
- 12 Hernesniemi, H., Berg-Andersson, B., Rantala, O., Suni, P. (2011). Kalliosta kullaksi, kummusta klusteriksi: Suomen mineraaliklusterin vaikuttavuusselvitys [From rock to gold, from hill to cluster: Finland's mineral cluster's effectiveness report, in Finnish]. Research Institute of the Finnish Economy, ETLA B252. Taloustieto Ltd., Helsinki.

to Tuusjärvi (2013, 18), the boom attracted many domestic and foreign exploration and mining companies and several new metal mines were opened in the early 2010s. This was in stark contrast to the downturn the mining industry had been suffering in Finland in the 1990s¹³.

For instance, in 2013, there were 12 metal ore mines operating in Finland. Five of these were gold mines and the other metal ore mines produced chromium, copper, nickel, zinc, sulphur, cobalt, iron and platinum group metals. Four of these metal ore mines were located in the region of Lapland, three in the region of Northern Ostrobothnia, one in the region of Kainuu and two in the region of North Karelia. Only two of these 12 metal mines were owned by Finnish companies and thus, the majority of operating Finnish metal ore mines are foreign owned. Further to this, in 2013, industrial minerals (for example dolomite, calcite, wollastonite, apatite, talc, quartz) were mined from 27 underground or open-pit mines. The turnover of mining for metal ores and industrial minerals in Finland in 2013 was approximately 1,5 billion euros. In the same year, metal ore mining and industrial minerals mining directly employed approximately 3000 individuals.^{14,15}

With annual aggregate¹⁶ production being approximately 120 million tonnes, the aggregate sector is by tonnage the largest extractive industry in Finland. Finland has also a long history in the natural stone industry. For example, Finland is an internationally well-known producer and exporter of granite and a world market leader in the soap stone industry.¹⁷ In addition to this, the long history of mining in Finland has led the Finnish metallurgical technology and manufacturers of mining equipment to be well known throughout the international mining community¹⁸.

However as a result of this rapid increase in mining and exploration, recent environmental problems and the inrush of foreign mining companies to Finland, citizens' concerns about and opposition to mining have emerged in recent public discourse and commentary on the industry¹⁹. For example, the Finnish public discussion on mining has been heavily influenced by the environmental impacts of the Talvivaara mine (currently operated by Terrafame Ltd.) situated in the region of Kainuu^{20,21}. These experiences have threatened the viability of the entire Finnish mining sector. Further to this, there have also been public concerns raised about the impacts of mining on other livelihoods such as tourism and reindeer herding that are often co-located in the same geographical landscapes as mining operations²². For these reasons, we have sought to systematically explore Finnish attitudes to the mining industry.

13 Tuusjärvi, M. (2013). From a mine to you – sustainability of the Finnish mining sector in the context of global supply chains of metals. Academic dissertation. Department of Geosciences and Geography, A23, Faculty of Science, University of Helsinki, Helsinki.

14 Kokko, M. (2014). Kaivosteollisuus [The mining industry, in Finnish]. Sector report 2/2014. Ministry of Employment and the Economy.

15 In 2016 there were 10 metal ore mines (three in Lapland, one in Northern Ostrobothnia, one in Kainuu and three in North Karelia) and 27 mines or excavations for industrial minerals (see Finnish Safety and Chemicals Agency: <http://tukes.fi/fi/Toimialat/Kaivokset/> and Vasara, H. (2017). Kaivosalan tilanne ja näkymät [State and outlook of the mining industry, in Finnish]. Sector report 3/2017. Ministry of Economic Affairs and Employment. Available at: http://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160206/Kaivosalan_tilanne_ja_nakymat_2017.pdf.

16 The term aggregate refers to either crushed rock or gravel and sand.

17 Finland's minerals strategy (2010). Available at: http://projects.gtk.fi/export/sites/projects/minerals_strategy/documents/FinlandsMineralsStrategy_2.pdf.

18 Geological survey of Finland. (2016). Information services. Metals and minerals production. Available at: <http://en.gtk.fi/information-services/mineral-production/>.

19 Tuusjärvi, M. (2013). From a mine to you: sustainability of the Finnish mining sector in the context of global supply chains of metals. Academic dissertation. Department Geosciences and Geography A23. University of Helsinki, Helsinki.

20 Tiainen, H., Sairinen, R. & Mononen, T. (2014). Talvivaaran kaivoshankkeen konfliktitoituminen [The conflictualisation of the Talvivaara mining project, in Finnish]. Ympäristöpolitiikan ja -oikeuden vuosikirja [The annual of environmental policy and environmental law] VII, 7–76.

21 Sairinen, R., Tiainen, H. & Mononen, T. (2017). Talvivaara mine and water pollution: an analysis of mining conflict in Finland. *The Extractive Industries and Society*, 4 (3), 640–651.

22 Hast, S. & Jokinen, M. (2016). Elinkeinojen yhteensovittaminen –tarkastelussa kaivostoiminta, poronhoito ja luontomatkaileu [Reconciliation of livelihoods –mining, reindeer herding and nature tourism in examination, in Finnish]. In Mononen, T. & Suopajarvi, L. (Eds.), *Kaivos suomalaisessa yhteiskunnassa [Mine in the Finnish society]*, Lapland University Press, Rovaniemi, Finland, 86–110.

The current data: Finnish attitudes toward mining 2016

This report summarises the key findings from a survey of 1,091 Finns about their attitudes toward mining. The data was collected in September 2016. The data presented here was collected using a postal survey. Recipients of the paper-based survey were also provided with an opportunity to complete an online version of the questionnaire.

The questionnaire was sent to 4200 Finns, aged 18-75 years and whose first language was Finnish. The sample was collected via the Finnish Population Register using simple random sampling. The total targeted sample (4200) was collected by dividing the population in continental Finland (Åland Islands are excluded) into two clusters:

1. population in the regions of North Karelia, Kainuu, Northern Ostrobothnia and Lapland (1170)
2. population in other regions of continental Finland (3030).

Most of the active metal ore mines are currently situated in the regions of North Karelia, Kainuu, Northern Ostrobothnia and Lapland. These are also the regions that have been influenced most strongly by the mining boom of the twenty first century. Based on latest census²³, these were also regions that had the highest numbers of employed labour force (workplaces) in their area in mining and quarrying (Standard Industrial Classification). In the current study, these regions were selected as being broadly representative of mining regions. To ensure that the views of Finns living in these mining regions were represented effectively, the sample targeted from these regions (1170) represents proportionately twice their population amount in the latest census that was available in 2016 when the sampling was planned. The sample from the other regions (3030) is proportionately equivalent to their overall population amount at that time.

The overall response rate to the survey was approximately 26%. In the majority of the analyses presented in this report, the results are represented by dividing this national sample into three geographical regions²⁴:

1. metropolitan region of Uusimaa
2. mining regions (identified above)
3. other Finnish regions.

23 Statistics Finland: Employed labour force in area (workplaces) by area, industry (TOL2008), sex and year 2007-2014. Available at: http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__vrm__tyokay/041_tyokay_tau_114.px/?rxid=2a10d8cd-3652-4f4d-afc2-3bb38fd84768.

24 Three geographical regions refer to the following classifications: 1.) metropolitan region of Uusimaa, 2.) mining regions: North Karelia, Kainuu, Northern Ostrobothnia and Lapland, 3.) other regions: Varsinais-Suomi, Satakunta, Kanta-Häme, Pirkanmaa, Päijät-Häme, Kymenlaakso, South Karelia, Etelä-Savo, Pohjois-Savo, Central Finland, South Ostrobothnia, Ostrobothnia, Central Ostrobothnia (regions in 2016).

Analysing the respondents in this way allows us to compare whether there are significantly different views between Finns who live and work in mining regions and those who do not.

In developing this survey for the Finnish context, we initially referred to a broad definition of mining, used in the Statistics Finland's Standard Industrial Classification (TOL2008). Their definition of mining includes: coal and lignite mining, oil and gas extraction, metal ore mining, non-metallic mineral mining and quarrying and mining support service activities. However, coal and lignite mining and oil and gas extraction activities are currently non-existent in Finland. Thus in our survey, the definition of mining is narrower and refers to: *metal ore mining, non-metallic mineral mining and quarrying and mining support service activities*.

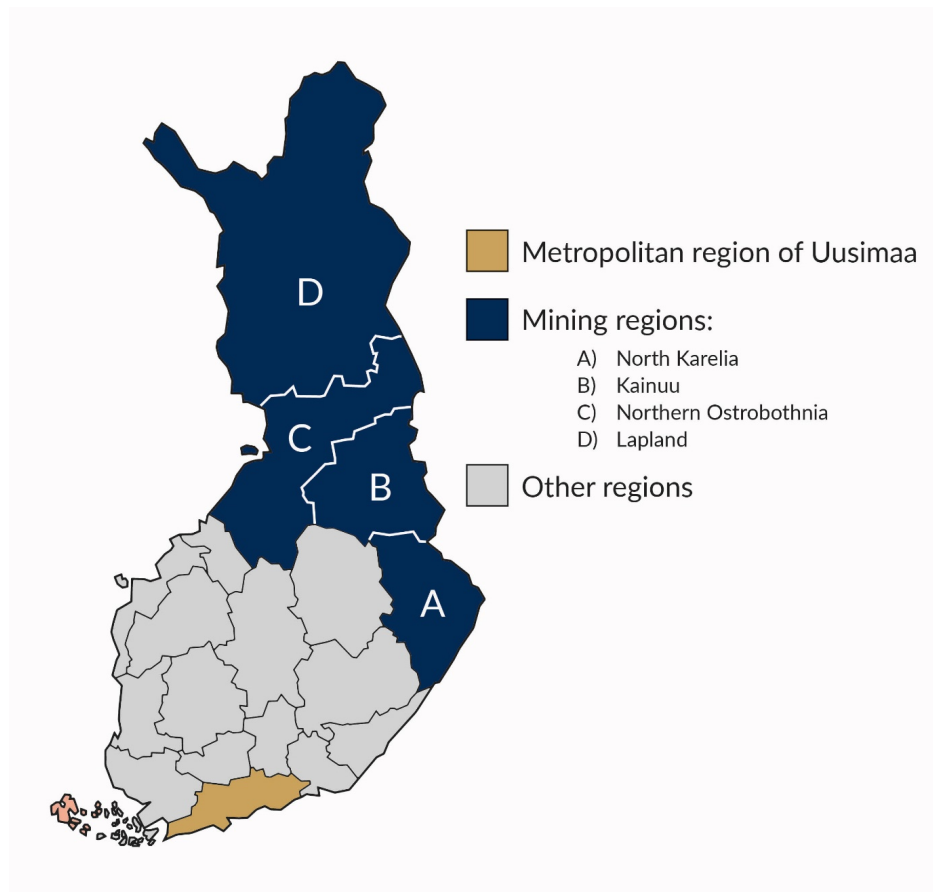


Figure 1 Map of Finland illustrating the three geographical regions of interest

Key demographic information about the sample is represented in figures 2-6. Generally the representativeness of the data is good. However, younger people seem to be somewhat underrepresented and older people overrepresented. The respondents are also slightly more educated than Finns in general.

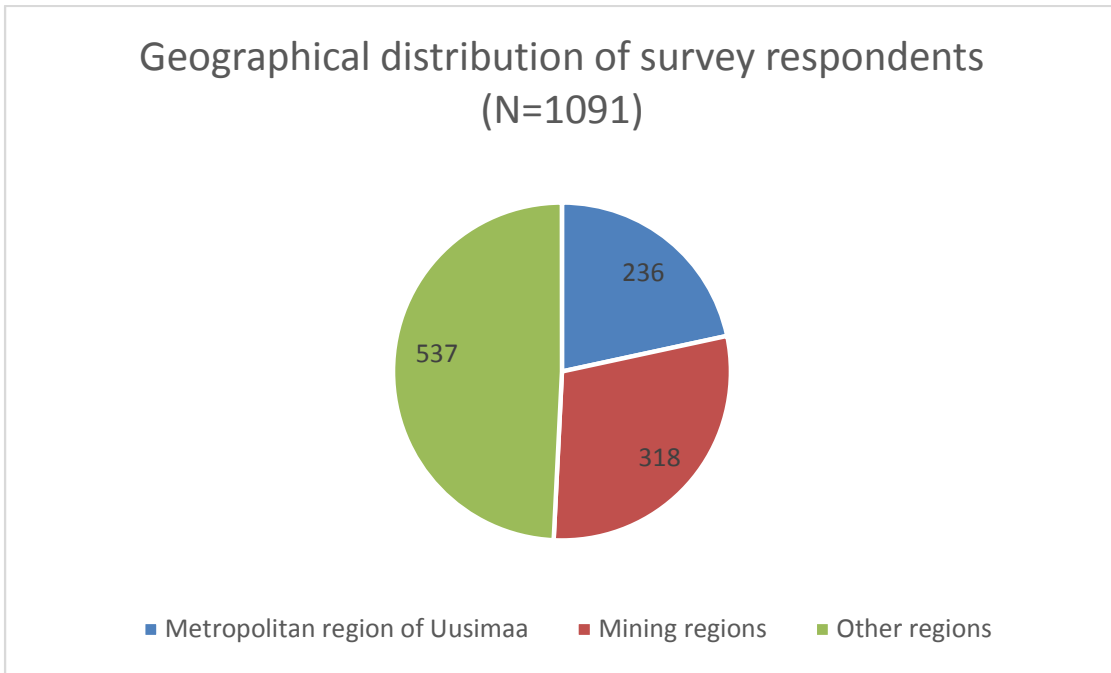


Figure 2 Geographical distribution of survey respondents

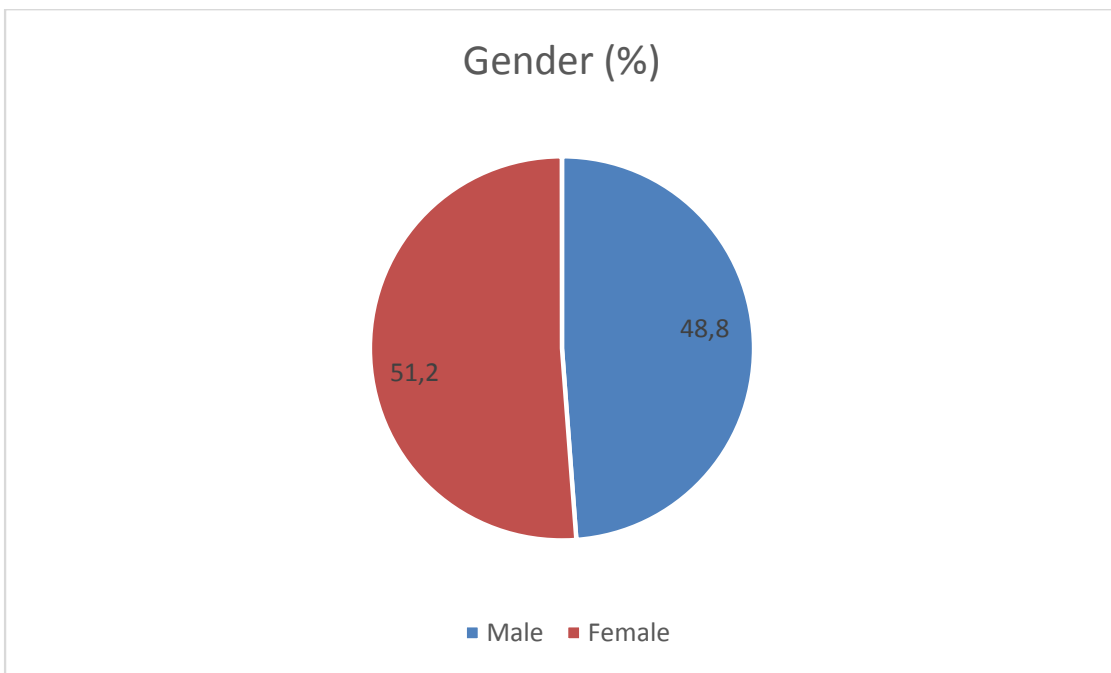


Figure 3 Respondents' gender distribution

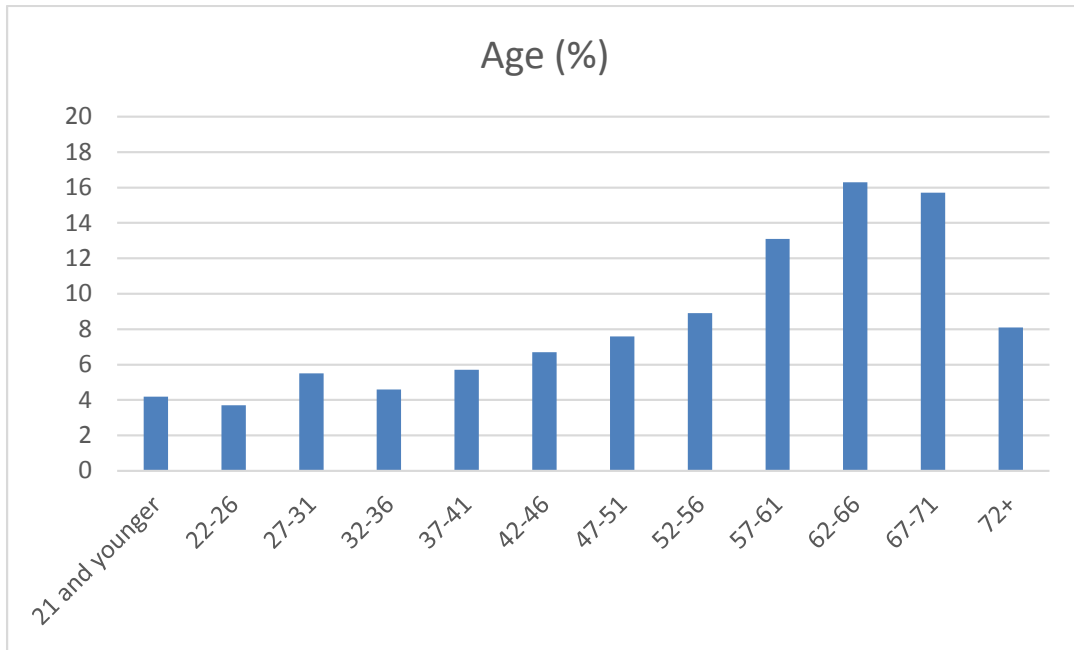


Figure 4 Respondents' age distribution

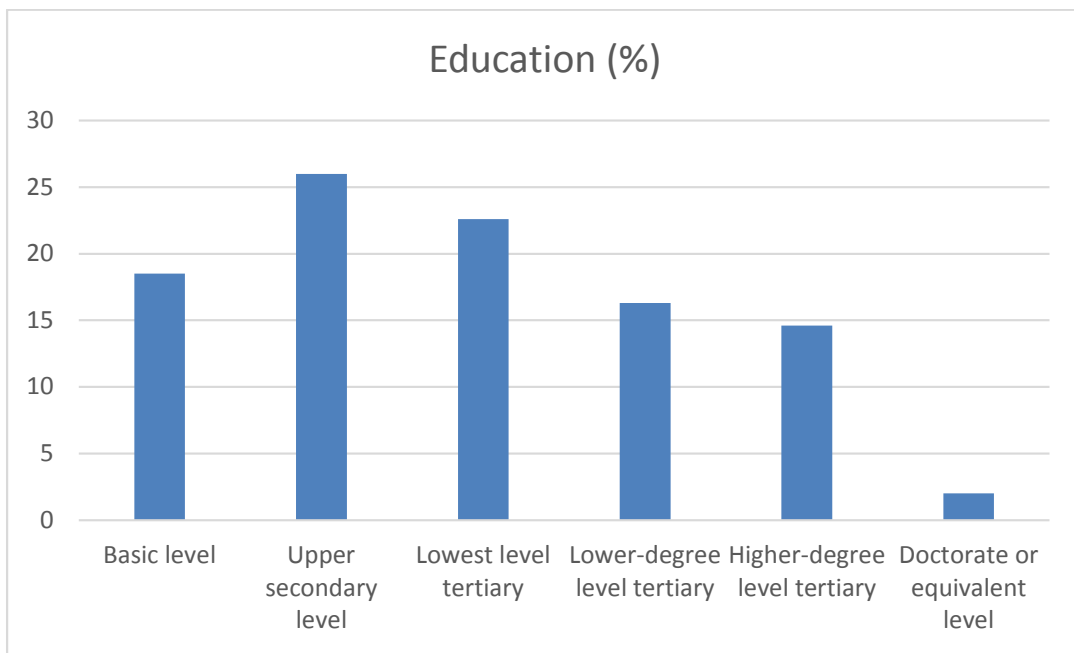


Figure 5 Respondents' education level

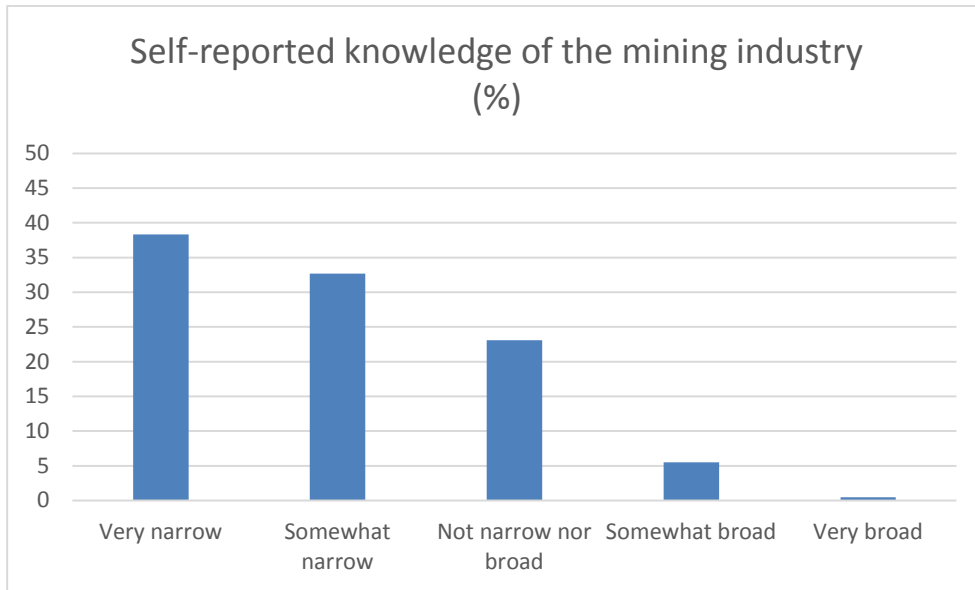


Figure 6 Respondents' self-reported knowledge of the mining industry

What does mining mean to Finns?

To understand how Finns view mining in the broader national context, we asked participants to rate their level of agreement on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*) with a number of statements about mining in Finland.

The importance of mining in Finland

Overall, mining was generally viewed as central to Finland and there was general disagreement with the statement that mining was not necessary for Finland (see Table 1).

Participants were asked to consider the economic contribution mining makes to Finland. The responses provided to the statements “*Mining contributes significantly to the standard of living in Finland*”, “*Mining contributes significantly to Finland’s economy*”, “*Mining is important to our way of life in Finland*”, and “*Mining will support Finland’s future prosperity*” vary from slight disagreement through to slight agreement depending on the geographical region. The results suggest higher agreement expressed by those in mining and other regions, and higher disagreement expressed by those in the metropolitan region.

Overall however, the respondents slightly agreed on mining being a significant contributor to the standard of living in Finland and to Finland’s economy. Accordingly, the overall responses to the statements “*Mining is important to our way of life in Finland*” and “*Mining will support Finland’s future prosperity*” were generally at the midpoint of the scale (i.e. 4).

Comparing the responses of those living in different geographical regions, we found that the respondents from the mining regions and other regions were more strongly of the view that mining is central to Finland and that mining contributes significantly to the standard of living and economy in Finland than respondents from the metropolitan region of Uusimaa.²⁵

Accordingly, the respondents living in the mining regions more strongly believed that mining was important to our way of life in Finland and that mining will support Finland’s future prosperity than respondents living in the metropolitan region of Uusimaa. Respondents from the metropolitan region of Uusimaa more strongly believed that mining is not necessary for Finland than respondents living in mining regions.

²⁵ Only statistically significant results are reported as differences in this report. These differences were calculated using a non-parametric Kruskal-Wallis test and are significant at the $p < .05$ level.

Table 1 Mean scores for items examining the position of mining in Finland overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Mining is central to Finland	4.96 (SD = 1.50)	4.68 (SD = 1.52)	5.14 (SD = 1.47)	4.97 (SD = 1.49)
Mining contributes significantly to the standard of living in Finland	4.16 (SD = 1.52)	3.87 (SD = 1.38)	4.38 (SD = 1.59)	4.16 (SD = 1.52)
Mining contributes significantly to Finland's economy	4.10 (SD = 1.52)	3.85 (SD = 1.38)	4.25 (SD = 1.56)	4.13 (SD = 1.55)
Mining is important to our way of life in Finland	4.03 (SD = 1.60)	3.77 (SD = 1.53)	4.19 (SD = 1.64)	4.06 (SD = 1.58)
Mining will support Finland's future prosperity	4.02 (SD = 1.54)	3.79 (SD = 1.48)	4.15 (SD = 1.59)	4.05 (SD = 1.54)
Mining is not necessary for Finland	2.94 (SD = 1.60)	3.18 (SD = 1.58)	2.73 (SD = 1.62)	2.95 (SD = 1.58)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Participants were also asked for their views on the importance of a range of sectors to the future of the Finnish economy. The results show that mining was seen as the least important sector to the future of the Finnish economy when compared with the other sectors. In relation to mining, the lowest mean agreement was found in the metropolitan region of Uusimaa ($M = 3.89$, $SD = 1.49$) and the highest in mining regions ($M = 4.52$, $SD = 1.55$). The mean agreement in other regions ($M = 4.24$, $SD = 1.50$) is situated between these two extremes. The differences in these mean values are statistically significant. Forestry, which has a long history in Finland, was seen as the most important sector to the future of the Finnish economy²⁶ (Table 2).

26 Information on certain industries' value added as a proportion of gross value added (% value added total, current prices, adjusted seasonally and per working day, TOL2008) in Finland (2016):

- Manufacturing, mining and quarrying and other industry: 20,3 %
 - Manufacturing: 16,9 %
 - o Manufacture of wood and paper products: 2,3 %
 - o Manufacture of chemicals and chemical products: 2,9 %
 - o Manufacture of metal products and machinery: 5,9 %
 - o Manufacture of electronic products and electrical equipment: 3,0 %
 - Mining and quarrying: 0,4 %
 - Electricity and water supply; waste management: 3 %

- Information and communication: 5,8 %

- Accommodation and food service activities: 1,7 %

- Arts, entertainment and recreation: 1,3 %

(Statistics Finland (2017). Industries' value added as a proportion of gross value added, %. Available at: https://www.tilastokeskus.fi/tup/suoluk/suoluk_kansantalous.html.

Statistics Finland (2017). Value added of industries quarterly (GDP production approach) 1990Q1-. Available at: http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__kan__ntp/?rxid=ca95dd4f-d91a-4a12-87d8-a27970aa8118.)

Table 2 Mean scores for items examining the importance of the following sectors to the future of the Finnish economy (statement: “When you think about the future of the Finnish economy, how important will the following sectors be?”).

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Forestry	6.11 (SD = 0.98)	5.87 (SD = 1.04)	6.17 (SD = 0.96)	6.18 (SD = 0.95)
Mechanical engineering industry and metals industry (manufacturing and metal processing industry)	5.79 (SD = 1.01)	5.61 (SD = 1.07)	5.84 (SD = 1.02)	5.84 (SD = 0.97)
Electronics and the electro technical industry	5.72 (SD = 1.07)	5.65 (SD = 1.08)	5.72 (SD = 1.05)	5.74 (SD = 1.09)
Food industry	5.64 (SD = 1.21)	5.43 (SD = 1.22)	5.79 (SD = 1.15)	5.65 (SD = 1.22)
Energy industry	5.58 (SD = 1.10)	5.42 (SD = 1.18)	5.65 (SD = 1.08)	5.62 (SD = 1.07)
Tourism	5.52 (SD = 1.25)	5.44 (SD = 1.19)	5.66 (SD = 1.25)	5.48 (SD = 1.27)
Information and communications sector	5.48 (SD = 1.25)	5.59 (SD = 1.21)	5.39 (SD = 1.31)	5.48 (SD = 1.24)
Chemical industry	5.24 (SD = 1.17)	5.20 (SD = 1.11)	5.19 (SD = 1.19)	5.29 (SD = 1.19)
Mining	4.24 (SD = 1.52)	3.89 (SD = 1.49)	4.52 (SD = 1.55)	4.24 (SD = 1.50)

Rated on a scale: 1 (not at all), 4 (uncertain), 7 (very important).

Are we dependent on mining?

Overall, responses to the statement “*Finland is dependent on mining*” were below the midpoint of the scale (i.e. 4) indicating a slight disagreement with the statement (Table 3). The respondents from the region of Uusimaa felt that Finland was less dependent on mining than respondents from the mining regions and other regions.

Interestingly, the respondents expressed a view that the country as a whole was more dependent on mining than their own communities. Most disagreement with the statement “*The municipality I live in is dependent on mining*” was found in the metropolitan region of Uusimaa and most agreement in the mining regions.

Table 3 Mean scores for items examining the perceived national and community dependence on mining overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Finland is dependent on mining	3.65 (SD = 1.56)	3.32 (SD = 1.52)	3.85 (SD = 1.58)	3.68 (SD = 1.53)
The municipality I live in is dependent on mining	2.07 (SD = 1.52)	1.71 (SD = 1.24)	2.45 (SD = 1.74)	2.01 (SD = 1.44)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

To what extent do Finns accept mining?

We asked participants to respond to the statement “*To what extent do you accept mining in Finland*” on a

scale from 1 (*not at all*) to 5 (*very much so*). Overall, the mean response to this item was 3.34 (SD = 1.11), which is above the midpoint of the scale used (i.e. 3), indicating a somewhat positive response. The average scores were highly consistent across metropolitan region, mining regions and other regions. A breakdown of the percentage of respondents in each of the response categories is presented in Figure 7.

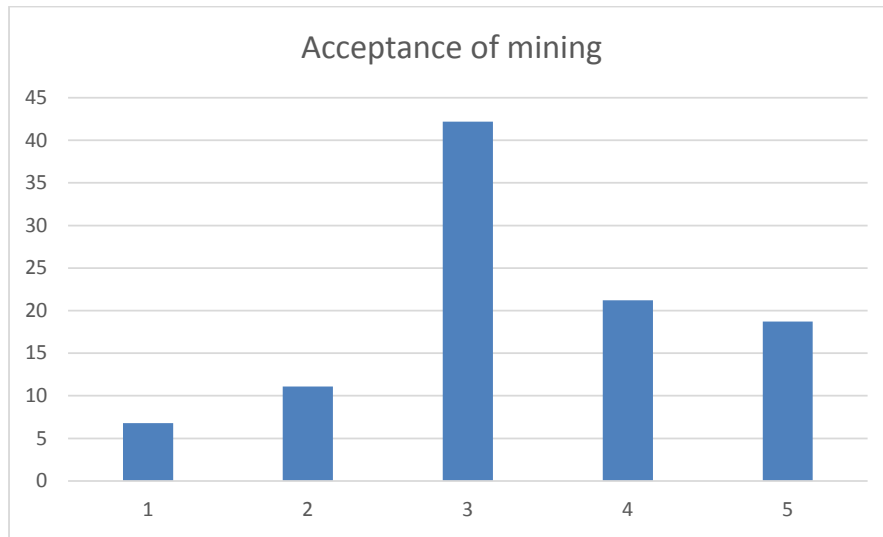


Figure 7 The distribution of respondent acceptance scores for mining in Finland (scale: 1 *not at all*, 3 *somewhat*, 5 *very much so*).

Since the previous statement is quite broad, the participants were also asked about their views on the acceptance of mining for particular extractives both in Finland generally and in their home municipality specifically. At the national scale, the most accepted commodities being mined were base metals, precious metals and industrial minerals. The least accepted was the mining of uranium (Figure 8).

In the case of precious metals (e.g. gold, silver), uranium and high tech-metals (e.g. lithium), there are no statistically significant differences in the responses between the three geographical regions. However, the acceptance of mining for base metals (e.g. nickel, iron, copper) and industrial minerals (e.g. calcite, dolomite, talc) is significantly higher in the mining regions than in the metropolitan region of Uusimaa.

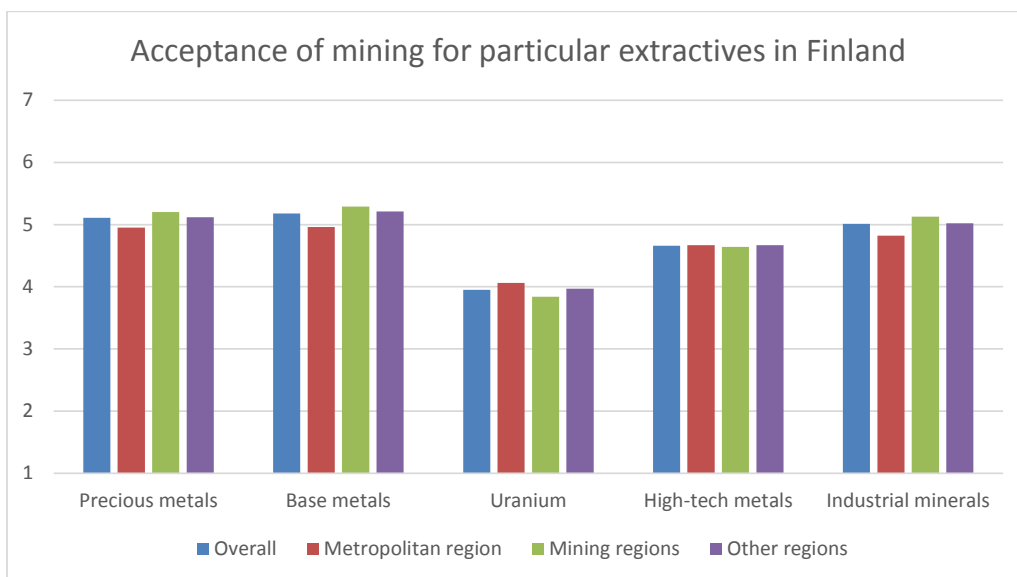


Figure 8 Mean levels of the acceptance of mining for particular extractives in Finland overall, and by region (scale: 1 *strongly disagree*, 4 *neither agree nor disagree*, 7 *strongly agree*).

The acceptance levels of the commodities of interest were generally lower when the respondents were asked about mining in their home municipality. The drop in mean responses is largest in the metropolitan region of Uusimaa. The most accepted commodities for mining in one's home municipality are precious metals, base metals and industrial minerals. The least accepted in one's home municipality is the mining of uranium (Figure 9).

The responses in relation to the acceptance levels of uranium mining in one's home municipality are consistent across all three geographical regions. The attitudes toward the acceptance of mining for precious metals, base metals and industrial minerals in one's home municipality are significantly more negative in the metropolitan region of Uusimaa than in mining regions and other regions. Further, attitudes toward the acceptance of mining for high tech-metals in one's home municipality are more negative in the metropolitan region (Uusimaa) than in the mining regions.

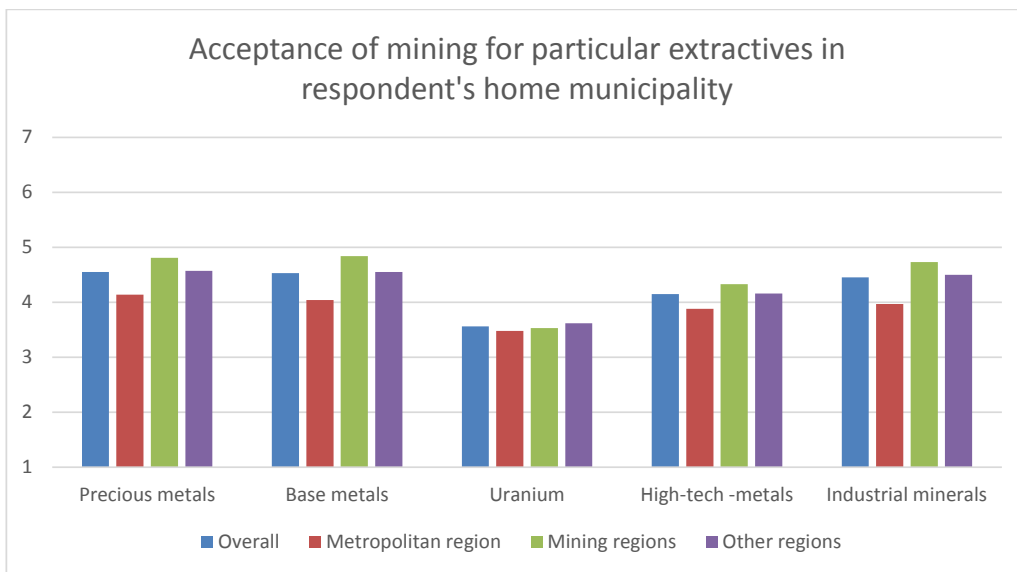


Figure 9 Mean levels of the acceptance of mining for particular extractives in the respondent's home municipality overall, and by region (*scale: 1 strongly disagree, 4 neither agree nor disagree, 7 strongly agree*).

The benefits of mining

To examine the positive benefits that mining creates, participants were asked to respond to a range of benefits that are understood to flow from mining for the country, regional communities and areas, and individuals.

Jobs, jobs, jobs

As shown in Table 4, the creation of jobs for Finns was the most important perceived benefit from mining amongst respondents. The respondents from mining regions agreed more strongly that mining creates jobs for Finns than those living in the metropolitan region of Uusimaa. The second most important benefit from mining was seen to be the opportunities that it provides for regional employment and training. The respondents from the mining regions regarded these opportunities more positively than respondents from the metropolitan region (Uusimaa). Accordingly, the respondents from the mining regions agreed more strongly that mining provides employment opportunities for women than respondents from the region of Uusimaa. There were no statistically significant differences in the responses to the statement regarding the employment and training opportunities that mining provides to Sámi people between the three regions.

Table 4 Mean ratings of the perceived benefits of mining (employment and training) overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Mining creates jobs for Finns	5.31 (SD = 1.25)	5.15 (SD = 1.21)	5.45 (SD = 1.26)	5.30 (SD = 1.25)
Mining enhances regional employment and training opportunities	4.99 (SD = 1.36)	4.87 (SD = 1.36)	5.14 (SD = 1.37)	4.96 (SD = 1.35)
Mining provides employment and training opportunities to Sámi people	4.28 (SD = 1.49)	4.13 (SD = 1.49)	4.24 (SD = 1.51)	4.36 (SD = 1.47)
Mining provides employment opportunities for women	4.12 (SD = 1.51)	3.96 (SD = 1.43)	4.30 (SD = 1.60)	4.08 (SD = 1.48)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Infrastructure improvements and social well-being

The next strongest ratings around benefits related to improvements in transport infrastructure and to the support of social well-being in areas outside the regional centres of Finland as a result of mining activ-

ity (Table 5). The responses are highly consistent across the three geographical regions. The respondents are generally of the opinion that mining has helped to improve transport infrastructure, such as roads and ports, in areas outside the regional centres of Finland. Interestingly however, the respondents generally did not believe that mining has helped to support social well-being, such as culture and leisure activities, in areas outside the regional centres of Finland.

Table 5 Mean ratings of the perceived benefits of mining (infrastructure improvements and social well-being) overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Mining has helped improve transport infrastructure, such as roads and ports, in areas outside regional centres of Finland	4.61 (SD = 1.44)	4.54 (SD = 1.34)	4.66 (SD = 1.54)	4.62 (SD = 1.43)
Mining has helped support social well-being, such as culture and leisure activities, in areas outside regional centres of Finland	3.94 (SD = 1.38)	3.91 (SD = 1.32)	3.89 (SD = 1.52)	3.97 (SD = 1.32)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

General regional benefits

General benefits for regional and Indigenous communities were the third most important benefit associated with mining (Table 6). There were no statistically significant differences between the three regions regarding the general benefits for regional and Indigenous (Sámi) communities. However, the (positive) effects of mining on regional communities in Finland were rated more positively than the (positive) effects of mining on Indigenous (Sámi) communities in Finland.

Table 6 Mean ratings of the perceived benefits of mining (general regional benefits) overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Mining has positive effects on communities in areas outside regional centres of Finland	4.25 (SD = 1.38)	4.05 (SD = 1.37)	4.34 (SD = 1.41)	4.28 (SD = 1.35)
Mining has positive effects on Indigenous (Sámi) communities in Finland	3.71 (SD = 1.53)	3.58 (SD = 1.49)	3.62 (SD = 1.59)	3.83 (SD = 1.50)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Personal benefits and life satisfaction

Whilst mining associated benefits at national and regional scales were rated somewhat positively for the most part, responses in relation to “personal benefits” tended to be rated more negatively. Benefits in terms of personal and family financial benefit from mining were both rated quite low by respondents. The perceived financial benefits to the “average Finn” (Figure 10) were however rated more positively, but the responses were still below the midpoint of the scale (i.e. 4). The responses provided in relation to personal financial benefit, family financial benefit and to the perceived financial benefits to the “average Finn” were consistent across the three regions.

When asked about their level of satisfaction with living in their community, respondents from all the three regions responded quite positively ($M = 5.84$, $SD = 0.97$). Results were highly consistent among the three regions.

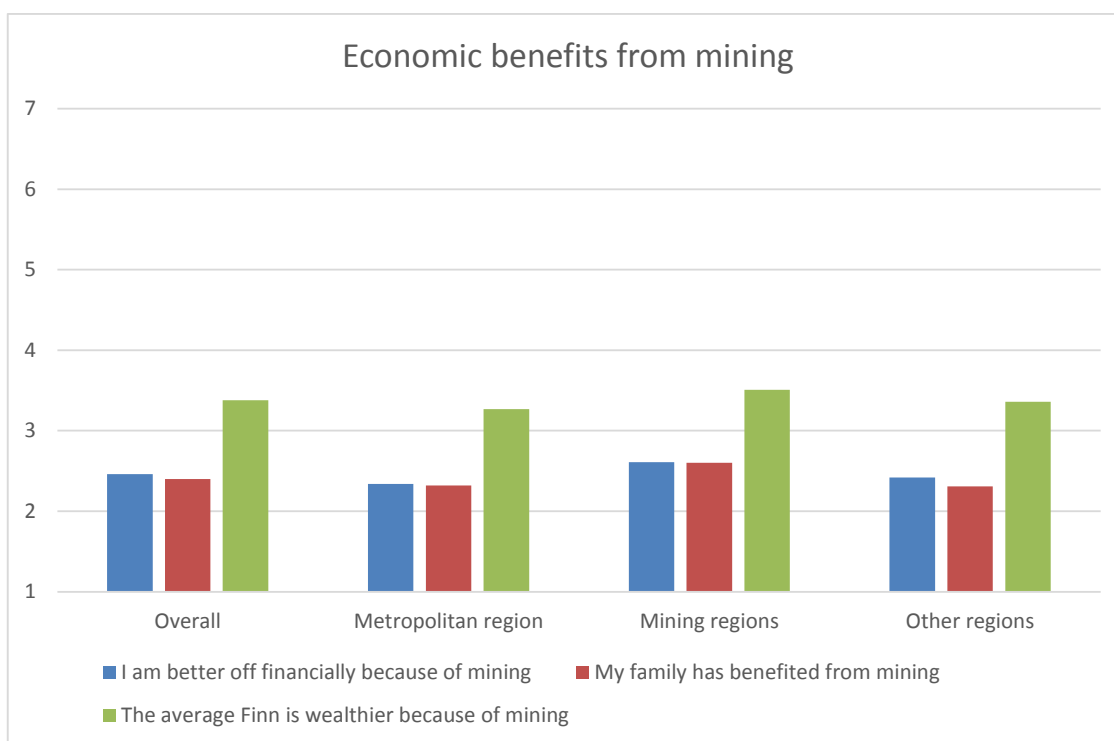


Figure 10 Mean levels of perceived economic benefits from mining overall, and by region (1 strongly disagree, 4 neither agree nor disagree, 7 strongly agree).

The negative impacts of mining

To examine the negative impacts of mining, we asked participants to respond to a range of issues including how mining impacted on the environment, other industry sectors, cost of living, and the health of communities surrounding mining operations.

The environment

When considering the impacts of mining, the respondents most strongly agreed that mining impacted negatively on water quality (both groundwater and surface water) and on the environment, in general. The respondents in all three regions were also of the opinion that mining contributes to climate change (Table 7). There were no statistically significant differences in the responses to these statements between the three regions.

Table 7 Mean ratings of the negative impacts of mining (the environment) overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
Mining impacts negatively on water quality (groundwater and surface water)	5.74 (SD = 1.33)	5.74 (SD = 1.31)	5.78 (SD = 1.42)	5.72 (SD = 1.29)
Mining causes negative environmental impacts	5.44 (SD = 1.43)	5.52 (SD = 1.42)	5.51 (SD = 1.48)	5.37 (SD = 1.39)
Mining on its part contributes to climate change	4.56 (SD = 1.57)	4.56 (SD = 1.56)	4.54 (SD = 1.60)	4.58 (SD = 1.56)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Other sectors

We also asked about the impact of mining on other sectors and industries (Table 8). In general, any negative impacts on the manufacturing and retail sectors were perceived to be quite low (below the mid-point of the scale, i.e. 4), but negative impacts on the agricultural sector and especially on the tourism sector were perceived to be much higher.

The responses relating to the impacts of mining on the agricultural, manufacturing and tourism sectors were consistent across the three regions. However, the respondents from the mining regions disagreed significantly more about the negative impact of mining on the retail sector than respondents from the metropolitan region and other regions.

Table 8 Mean ratings of the negative impacts of mining (other sectors) overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropoli- tan region (Uusimaa)	Mining regions	Other regions
Mining impacts negatively on the tourism sector	4.56 (SD = 1.74)	4.59 (SD = 1.69)	4.65 (SD = 1.85)	4.49 (SD = 1.69)
Mining impacts negatively on the agricultural sector	4.08 (SD = 1.51)	4.29 (SD = 1.47)	3.98 (SD = 1.61)	4.04 (SD = 1.46)
Mining impacts negatively on the manufacturing sector	3.20 (SD = 1.38)	3.35 (SD = 1.38)	3.08 (SD = 1.44)	3.20 (SD = 1.33)
Mining impacts negatively on the retail sector	3.18 (SD = 1.39)	3.38 (SD = 1.38)	2.93 (SD = 1.39)	3.23 (SD = 1.38)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Health and cost of living

Respondents expressed slight agreement (above the midpoint of the scale, i.e. 4) that mining has negative impacts on the health of local communities. However, the impacts on the cost of living and effects on housing costs were rated quite low overall (Table 9). The responses to these statements were consistent across the three regions.

Table 9 Mean ratings of the negative impacts of mining (health and cost of living) overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropoli- tan region (Uusimaa)	Mining regions	Other regions
Mining has negative impacts on the health of local communities	4.48 (SD = 1.61)	4.59 (SD = 1.53)	4.35 (SD = 1.73)	4.51 (SD = 1.57)
Housing is more expensive in my area as a consequence of mining activity	2.95 (SD = 1.47)	2.76 (SD = 1.46)	3.02 (SD = 1.52)	2.99 (SD = 1.45)
The cost of living, excluding housing, has increased in my area as a consequence of mining	2.80 (SD = 1.41)	2.68 (SD = 1.40)	2.86 (SD = 1.43)	2.81 (SD = 1.40)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Fairness, faith in governance and trust

Mining has a complex relationship with Finnish society. It creates jobs and economic opportunities, but it also brings challenges for people living alongside the industry and for governments who are charged with managing Finland's mineral resources on behalf of all its citizens.

To tease out some of this complexity, we asked participants about the distributive fairness of mining associated benefits, how fairly they felt they were treated in decision making processes regarding the industry, the level of faith they had in our legislative and regulatory frameworks for managing mining, and more broadly, the degree to which they trusted important actors in the industry.

Distributional fairness

We asked participants to rate the extent to which they believed the benefits associated with mining were distributed fairly and the extent to which Finland received its fair share of tax from mining. We also asked participants about their attitudes toward foreign mining companies and foreign ownership of mining operations.

Overall, respondents were not strongly of the view that the economic benefits of mining are distributed fairly, with the average rating ($M = 3.19$, $SD = 1.47$) across the whole sample below the midpoint of the scale used (i.e. 4, see Figure 11). However, the respondents from other regions (not including Uusimaa) tended to express a significantly higher level of agreement that the benefits from mining are distributed fairly than respondents from mining regions.

As illustrated in Figure 11 below, respondents felt more strongly overall ($M=3.62$, $SD= 1.47$) that mining communities received a fair share of the benefits of mining. This was particularly the case when compared to perceived personal benefit from mining ($M=3.08$, $SD=1.51$).

The responses to the item "*People like me receive a fair share of the benefits from mining*" were consistent across the three geographical regions. However, respondents from other regions (not including mining regions) expressed higher agreement with the view that mining communities receive a fair share of the benefits from mining than respondents from the metropolitan region.

Participants were asked the extent to which they believed Finland as a nation received a fair share of tax from the mining industry. Responses were again below the midpoint of the scale used (i.e. 4) indicating a slight disagreement with this statement. The average rating across the whole sample was 3.44 ($SD = 1.53$). Respondents from mining regions more strongly disagreed on the issue of Finland receiving a fair share of tax from the mining industry than respondents from other regions (not including Uusimaa).

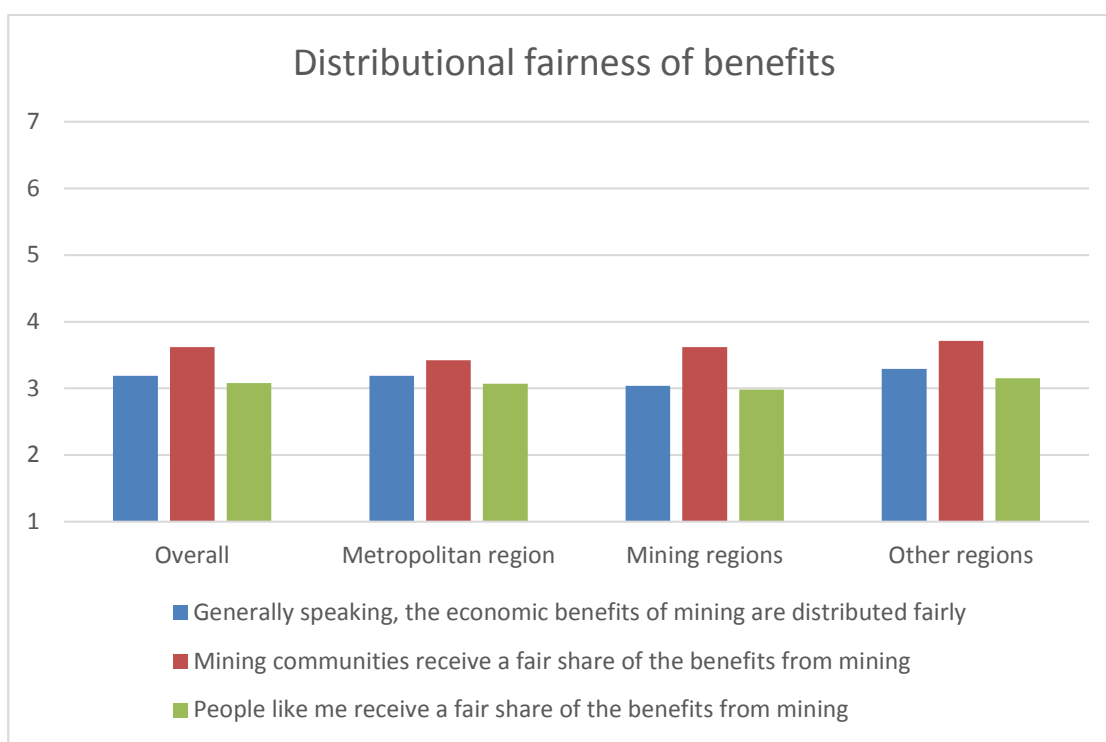


Figure 11 Mean levels of perceived distributional fairness of benefits from mining overall, and by region (scale: 1 strongly disagree, 4 neither agree nor disagree, 7 strongly agree).

Participants were also asked whether there should be restrictions on the foreign ownership of mining operations in Finland. The respondents generally agreed strongly with this statement (Table 10). The respondents from mining regions agreed more strongly that there should be restrictions on the foreign ownership of mining operations in Finland than respondents from the metropolitan region of Uusimaa.

When asked about the acceptance of mining conducted by foreign mining companies in Finland, the responses were below the midpoint of the scale (i.e. 4) indicating a slight disagreement with the statement. There were no statistically significant differences in the responses between the three regions.

Table 10 Mean scores for items examining attitudes to foreign ownership and foreign mining companies overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
There should be restrictions on the foreign ownership of mining operations in Finland	5.69 (SD = 1.48)	5.55 (SD = 1.50)	5.82 (SD = 1.45)	5.67 (SD = 1.49)
I accept mining conducted by foreign companies in Finland	3.46 (SD = 1.71)	3.61 (SD = 1.73)	3.33 (SD = 1.68)	3.47 (SD = 1.72)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

The results reflect a somewhat negative attitude towards foreign mining companies and a view that Finland as a nation does not receive a fair share of tax from the mining industry. These results may reflect resource nationalism, which is the general view that Finland's mineral resources are a national endowment and should be developed to the benefit of Finland and Finnish citizens as much as possible.

Procedural fairness

Procedural fairness in this survey refers to whether individuals perceive that they have a reasonable voice in decision-making processes^{27,28}. Therefore, the more people feel that they can participate in decision-making processes about mining and feel respected by the important decision makers (e.g. governments and the extractive industries), the fairer they will regard the procedures relating to mining in Finland.

We asked participants to rate the extent to which Finns have opportunities to participate in decisions about mining on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Responses overall were around the midpoint of the scale ($M = 4.13$, $SD = 1.76$) with no statistically significant differences between the three geographical regions.

We also asked participants to rate the extent to which the mining industry, municipal and state governments listen to and respect community opinions (Figure 12). As with distributive fairness, responses to these items were below the midpoint of the scale (i.e. 4). Respondents felt that the municipal government listened to and respected community opinions more than the mining industry and state government did. Responses to these items were consistent across the three regions.

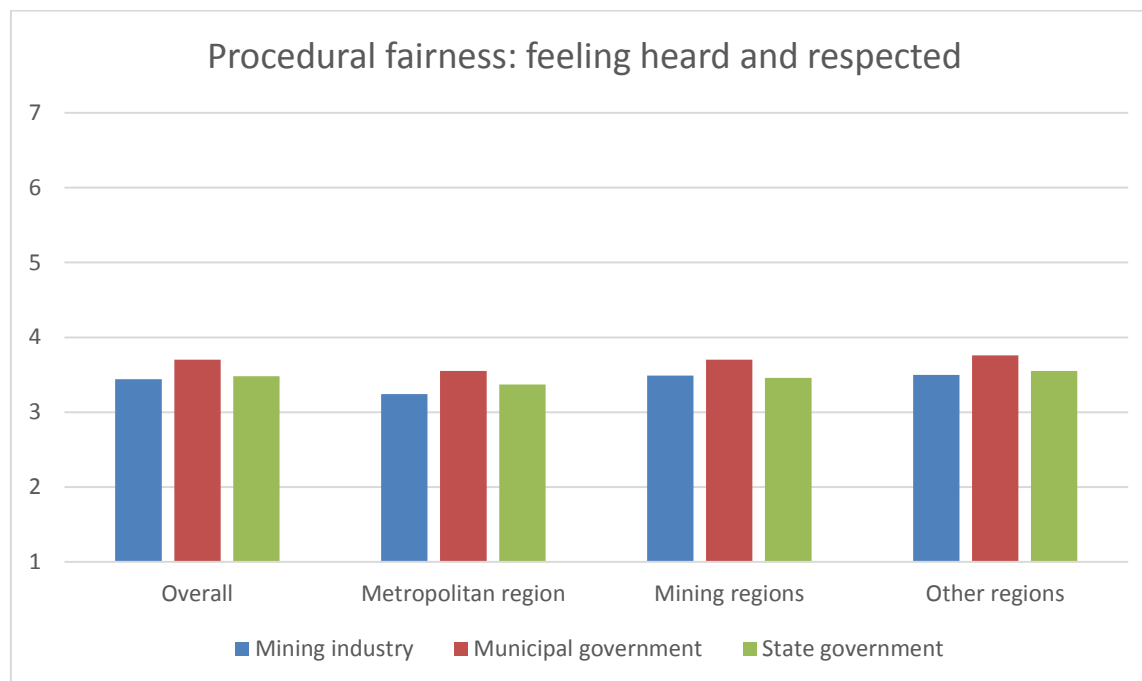


Figure 12 Mean levels of perceived procedural fairness overall, and by region (*scale: 1 strongly disagree, 4 neither agree nor disagree, 7 strongly agree*).

Ensuring the mining industry does the ‘right thing’

Feeling heard and respected is fundamental to a sense of procedural fairness. But whom or what can actually influence the way mining takes place? We asked participants to rate the extent to which they believe legislation and regulation, and municipal and state governments can hold the mining industry to account. In both items, responses were below the midpoint of the scale (i.e. 3), indicating a lack of faith

27 Besley, J. C. (2010). Public engagement and the impact of fairness perceptions on decision favourability and acceptance. *Science Communication*, 32 (2), 256–280. doi: 10.1177/1075547009358624.

28 Tyler, T. R. (2000). Social justice: outcome and procedure. *International Journal of Psychology*, 35, 117–125. doi: 10.1080/002075900399411.

that these formal institutions are sufficiently able to influence the way mining takes place (Table 11). The respondents from the metropolitan region more strongly disagreed with the ability of legislation and regulation to ensure that mining companies do the right thing than respondents from other regions (not including mining regions). There are no statistically significant differences in the responses to the statement “*Municipal and state governments are able to hold the mining industry accountable*” between the three geographical regions.

We also asked for participants’ views on whether government officials reliably monitor the environmental effects of mining in Finland and whether the environmental legislation in Finland guarantees that mining will not cause significant environmental and health hazards. Responses to these items were below the midpoint of the scale indicating distrust towards both officials and environmental legislation. Distrust towards environmental legislation was even greater than distrust towards officials. Responses to these items were consistent across the three regions.

Table 11 Mean ratings of governance capacity overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
In Finland the officials reliably monitor the environmental effects of mining	2.61 (SD = 1.15)	2.46 (SD = 1.12)	2.62 (SD = 1.18)	2.66 (SD = 1.15)
Legislation and regulation can be counted on to ensure mining companies do the right thing	2.50 (SD = 1.07)	2.37 (SD = 1.08)	2.48 (SD = 1.09)	2.57 (SD = 1.04)
The environmental legislation in Finland guarantees that mining will not cause significant environmental and health hazards	2.42 (SD = 1.17)	2.34 (SD = 1.15)	2.40 (SD = 1.18)	2.46 (SD = 1.17)
Municipal and state governments are able to hold the mining industry accountable	2.41 (SD = 1.12)	2.32 (SD = 1.10)	2.39 (SD = 1.13)	2.47 (SD = 1.12)

Rated on a scale: 1 (not at all), 3 (somewhat), 5 (very much so).

Mining communities and the Finnish public more generally also have the ability to influence the way mining takes place, either through directly influencing mining companies or through influencing government policy. In examining citizen agency generally, the overall responses to the item “*I think that the Finnish public can successfully advance its national interests together*”, were above the midpoint of the scale (i.e. 4) indicating a general level of agreement (Table 12). Respondents from other regions (not including the metropolitan region of Uusimaa) more strongly agreed with this item than the respondents from mining regions.

However, overall responses to the other two statements examining citizen agency that targeted the ability to influence mining specifically (i.e. “*I think that citizens in Finland are able to influence government’s mining related policies*”, “*I think that citizens in Finland are capable of ensuring the mining industry do the right things for this country*”) were below the midpoint of the scale indicating a general level of disagreement. The responses to these items were consistent across the three regions.

Finally, there was a strong and consistent sentiment expressed regarding the need to gain the consent of local communities and Indigenous communities before developing or commencing mining projects in Finland. There were no statistically significant differences in the responses between the three geographical regions.

Table 12 Mean ratings of public efficacy, agency and need for consent overall, and by region.

Item	Mean agreement (Standard Deviation)			
	Overall	Metropolitan region (Uusimaa)	Mining regions	Other regions
It is necessary to gain the consent of local communities before the development of a mining project is started	5.87 (SD = 1.22)	5.83 (SD = 1.17)	5.76 (SD = 1.39)	5.94 (SD = 1.13)
It is necessary to gain the consent of Indigenous communities before the development of a mining project is started	5.80 (SD = 1.35)	5.73 (SD = 1.32)	5.70 (SD = 1.49)	5.88 (SD = 1.27)
I think that the Finnish public can successfully advance its national interests together	4.49 (SD = 1.44)	4.52 (SD = 1.44)	4.31 (SD = 1.46)	4.58 (SD = 1.41)
I think that citizens in Finland are able to influence government's mining related policies	3.62 (SD = 1.48)	3.55 (SD = 1.48)	3.54 (SD = 1.50)	3.70 (SD = 1.48)
I think that citizens in Finland are capable of ensuring the mining industry do the right things for this country	3.45 (SD = 1.56)	3.35 (SD = 1.49)	3.35 (SD = 1.58)	3.55 (SD = 1.56)

Rated on a scale: 1 (strongly disagree), 4 (neither agree nor disagree), 7 (strongly agree).

Moreover, when we asked participants the extent to which they agreed that the mining industry was socially responsible, the overall average rating was below the midpoint (i.e. 4) of the scale used ($M = 3.40$, $SD = 1.60$) indicating disagreement. The responses were consistent across the metropolitan region, mining regions and other regions. The overall average rating was also similarly slightly below the midpoint of the scale regarding the extent to which the respondents believed the mining industry is prepared to change its practices in response to community concerns ($M = 3.40$, $SD = 1.57$). Again, these responses were consistent across the three regions.

Trust

We asked participants to rate their level of trust in a range of key actors in the mining sector in Finland. These actors included: the mining industry, municipal government, state government and non-government organisations (NGOs). We averaged the responses to three items assessing trust in each of these actors: the extent each was trusted to “act in the best interests of society”, “act responsibly” and “do what is right”.

Two patterns are clear in the data (Figure 13). First, NGOs were the most trusted, with state and municipal governments second. Least trusted was the mining industry. Second, the levels of trust that Finnish citizens have in these actors overall are low. For instance, the level of trust in NGOs was only slightly above the midpoint of the scale (i.e. 3) and the trust levels in the three other groups were below the midpoint of the scale. There were no statistically significant differences in the average scores between the three geographical regions.

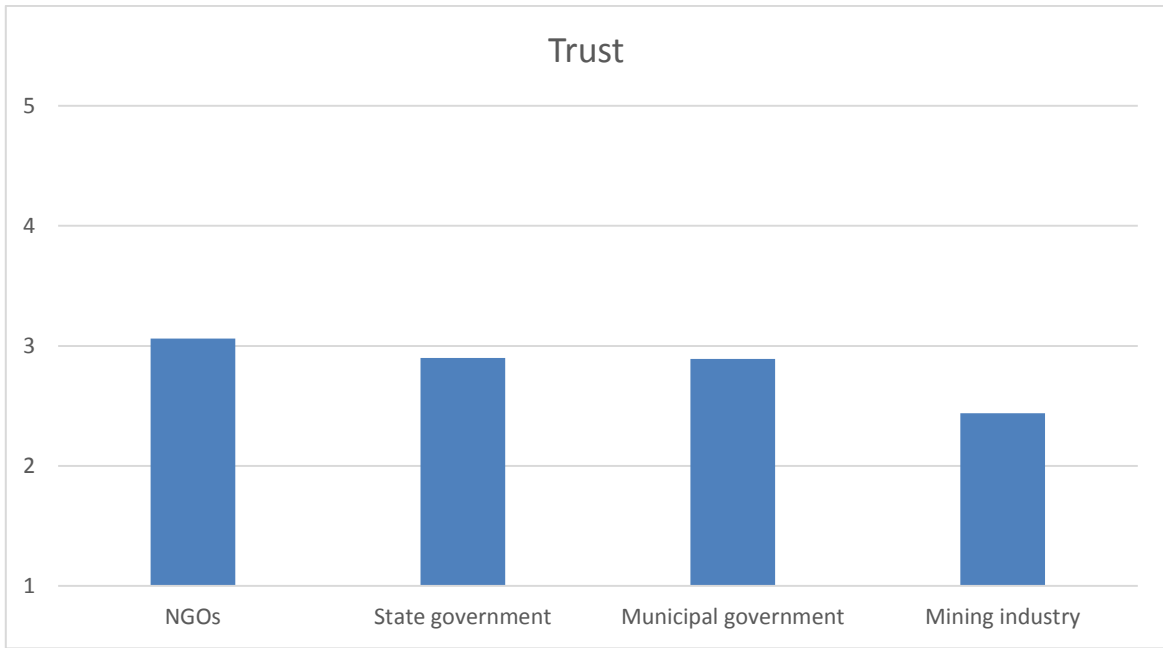


Figure 13 Mean level of respondent trust in mining industry actors (*scale: 1 not at all, 3 somewhat, 5 very much so*).

Going a little deeper...what leads to acceptance of mining?

It is important that we understand what underpins mining's 'social licence to operate', or its acceptance within society.

We explored this question in the national survey data in two ways. First, we explored how Finns weigh up the benefits and impacts of mining in determining their level of acceptance of the industry. Second, we explored the role of Finland's governance systems and behaviour of the mining industry in building trust and acceptance with Finland's citizens.

Is it worth it? Weighing up the benefits and impacts of mining

Using multiple regression analysis, we examined how Finns' perceptions of mining associated impacts and benefits relate to the acceptance of mining. We included composite measures of the three main impact and benefit areas in this analysis, respectively:

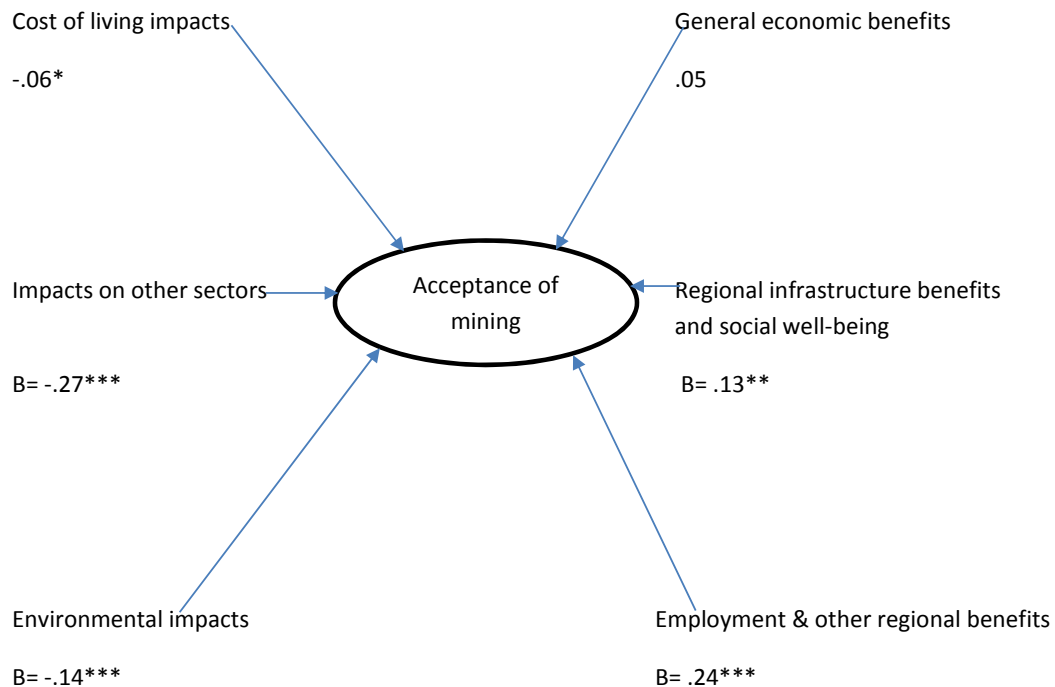
- impacts on environment (including climate change), on cost of living, and on other sectors (including manufacturing, agriculture, tourism and retail);
- employment and other regional benefits, general economic benefits (personal, family and national wealth), and development of regional infrastructure (transport) and social well-being.

Significant predictors of acceptance were:

- impacts on environment,
- cost of living impacts,
- impacts on other sectors,
- benefits on regional transport infrastructure and social well-being
- employment and other regional benefits.

The more negative respondents felt these impacts were, the less likely they accepted the industry; and the more positive respondents felt these benefits were, the more likely they accepted the industry (Figure 14).

The two *strongest* predictors of acceptance in the analysis were impacts on other sectors and employment and other regional benefits that flow from mining.



Beta weights (β) represent the relative strength of each relationship. Positive β -values indicate a positive relationship; negative β -values indicate a negative relationship.

Figure 14 Stylised regression model of impacts and benefits predicting acceptance of mining.

We were also interested in understanding whether people in Finland felt that the benefits of mining outweigh the perceived impacts on mining, and how this affected their acceptance of the industry. To do this, we asked participants to indicate their agreement with the statement “*Considering the benefits and costs associated with mining, it is worthwhile to pursue mining in Finland*”. The overall mean response to this item was above the midpoint of the scale used ($M = 4.19$, $SD = 1.65$) indicating a slight agreement with the statement. The mean responses to this item were consistent across the regions of interest.

Social licence is everyone’s business

While impacts and benefits of mining are important in shaping the level of acceptance of mining among Finland’s citizens, achieving a social licence is also about building trust between companies, governments and society. There is a growing understanding that the way people are treated in decision-making processes, the way that benefits are distributed from mining, and the role of governance in setting the rules for mining, are important to developing this trust and acceptance.

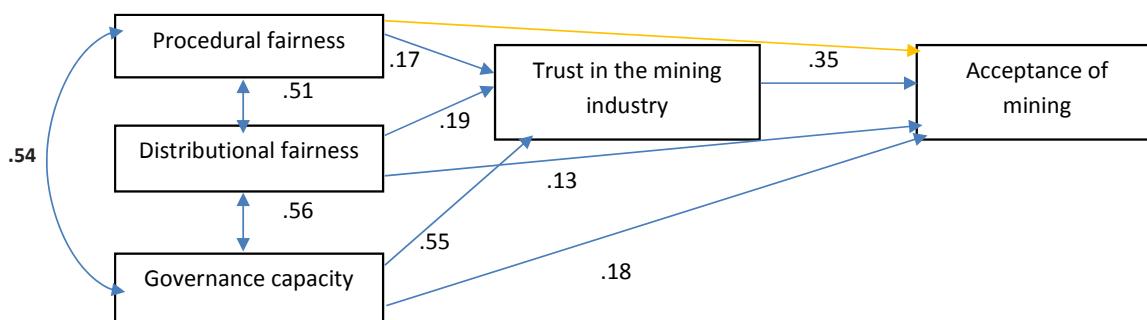
We explored this in the data by examining the role of the following measures in predicting trust in industry and acceptance of the industry, in Finland:

- procedural fairness – the extent to which the industry listens to and respects community opinions, and changes its practices in response to community concerns;
- distributive fairness – the extent to which economic benefits from mining are distributed fairly, and each citizen receives a fair share of the benefits of mining;
- governance capacity – the extent to which Finns feel that our municipal and state governments, and legislation/regulation, can ensure mining companies do the right thing.

To do this, we used path analysis²⁹, a sophisticated statistical modelling technique that allows us to examine the relationships between these measures simultaneously. The results of this analysis can be seen in Figure 15 below. Higher values indicate stronger relationships.

The results suggest that:

- trust in the industry is a strong predictor of acceptance of industry. Higher trust in the mining industry leads to higher acceptance of mining among the respondents. Put another way, the industry's social licence is facilitated by the level of trust that the Finnish public have in it
- the more Finns have faith in the fairness of the procedures by which the industry engages the public, the more they have trust in the mining industry
- the more Finns feel that the benefits of mining are distributed fairly, the higher their level of trust in the industry
- the more faith that people have in Finland's governance capacity to ensure mining companies do the right thing, the more they accept the industry
- but, perceptions of governance capacity is a much stronger positive predictor of trust than it is of acceptance
- also, perceptions on distributional fairness is a slightly stronger positive predictor of trust than it is of acceptance – these results indicate that trust is a critical vehicle for achieving social licence
- procedural and distributive fairness and governance capacity are all strongly positively related to each other – more of one leads to more of the others



Model fit: chi-square: 3,804, p=.051, CMIN/DF: 3,804, NFI: 0,998, TLI: 0,982, CFI: 0,999, RMSEA: 0,051

The values on each arrow are standardized regression weights and represent the relative strength of each relationship. Positive regression weights indicate a positive relationship; negative regression weights indicate a negative relationship. Yellow arrow indicates a relationship that is not statistically significant and no regression weight is reported for it. The relationship that wasn't statistically significant was removed from the final analysis.

Figure 15 Social acceptance of mining path model A.

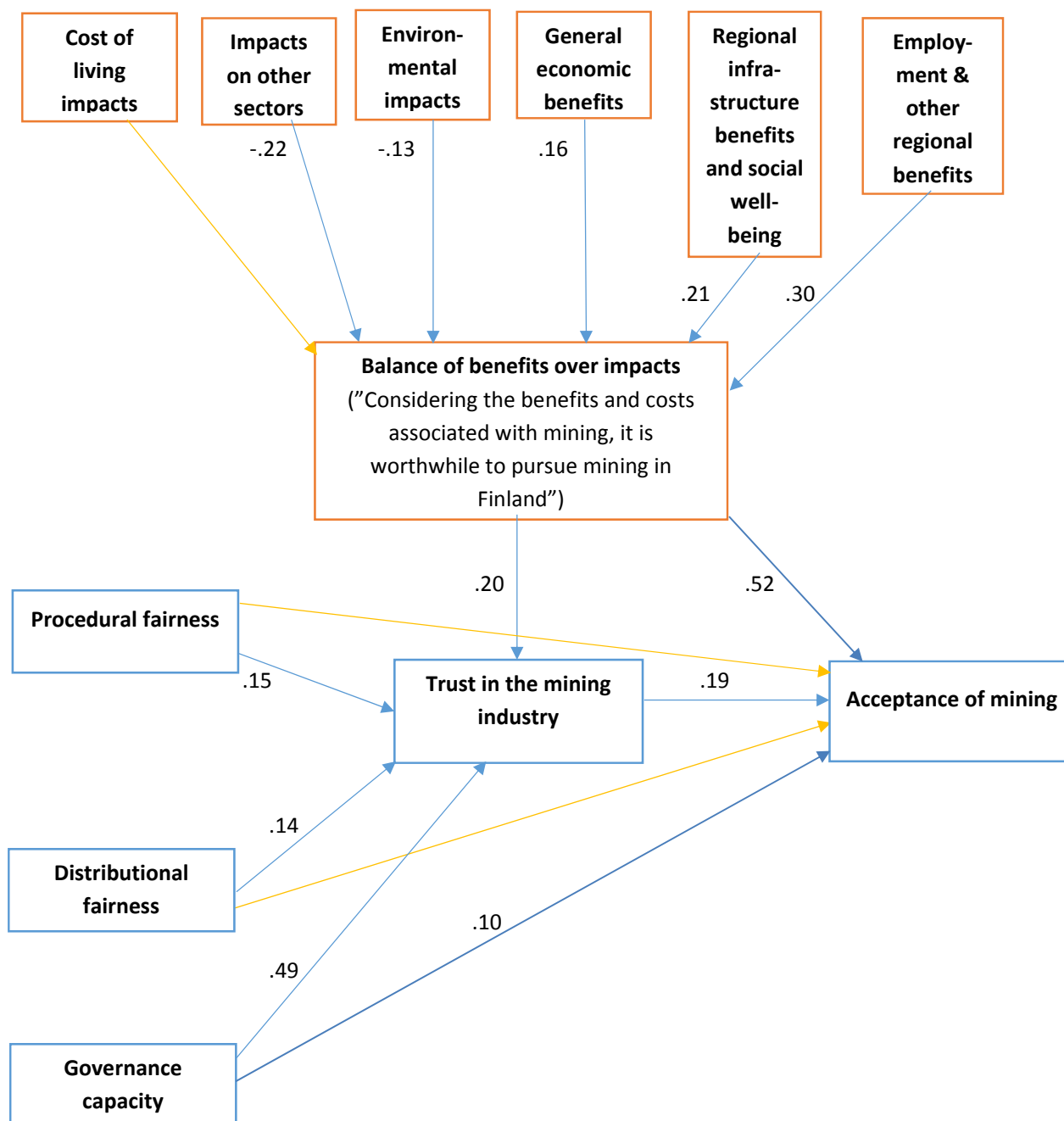
We also tested a path model that broadens the previous model by including the three main impact and benefit measures discussed earlier (chapter “Is it worth it? Weighing up the benefits and impacts of mining”) and a statement measuring the balance of benefits over impacts (Figure 16).

The results show that,

- the more negative the impacts on other sectors and on environment are felt, the less worthwhile it is considered to pursue mining in Finland when the benefits and costs of mining are weighed up
- the more positive the general economic benefits, regional infrastructure benefits and social well-being and employment and other regional benefits are felt, the more worthwhile it is considered to pursue mining in Finland when the benefits and costs of mining are weighed up

29 For more information see Jenatabadi, H. S. (2015). An overview of path analysis: mediation analysis concept in structural equation modeling. Available at: repository.um.edu.my/99525/1/2015%2002.pdf.

- The more it is felt that considering the benefits and impacts of mining, it is worthwhile to pursue mining in Finland, the more mining industry is trusted and also the more mining is accepted. Balance of benefits over impacts is a stronger predictor of acceptance of mining than it is of trust in the mining industry.
- in this model distributive fairness isn't no longer a statistically significant predictor of acceptance of mining
- otherwise the results are similar in their interpretation than in the previous path model (see Figure 15) even though the relative strengths of the relationships tend to get weaker



Model fit: CMIN/DF: 9,427, NFI: 0,975, TLI: 0,901, CFI: 0,977, RMSEA: 0,088. (Model fit: CMIN/DF: 9,427, NFI: 0,975, TLI: 0,901, CFI: 0,977, RMSEA: 0,088)

The values on each blue arrow are standardized regression weights and represent relative strength of each relationship. Positive regression weights indicate a positive relationship and negative regression weights indicate a negative relationship. Yellow arrows indicate relationships that are not statistically significant and no regression weights are reported for them. The relationships that weren't statistically significant were removed from the final analysis. When the model was tested, correlations were hypothesized to exist between all exogenous variables.

Figure 16 Social acceptance of mining path model B

Summary of main results and discussion

When considering the importance of mining, the data shows that mining is generally considered as central to Finland. Generally, the respondents from mining regions tended to consider mining as more important to Finland than the respondents from the metropolitan region of Uusimaa.

However, it is also important to contextualize the role of mining in Finland by comparing it to other industry sectors. The results of this survey showed that mining was seen in all three geographical regions as the least important industry to the future of the Finnish economy when compared with other key industries. Respondents from the metropolitan region of Uusimaa rated the contribution of mining to Finland's future economy as least important, while respondents from mining regions rated this contribution as most important. However, forestry, which has a long history in Finland was considered to be the most important industry to the future of the Finnish economy in all three geographical regions.

Overall, when considering the general acceptance of mining, the results indicated a somewhat positive response. The general acceptance of mining weren't weak nor very strong. The average scores were highly consistent across metropolitan region, mining regions and other regions.

In addition to the general acceptance of mining, we were also interested in examining more precisely the acceptance of mining for particular extractives both at the level of Finland in general and at the level of the respondent's home municipality.

At the level of Finland in general, the acceptance levels especially for the mining of base metals, precious metals and industrial minerals were quite high. The most accepted were the mining of base metals, precious metals and industrial minerals and the least accepted was the mining of uranium. The acceptance of mining for base metals and industrial minerals was significantly higher in the mining regions than in the metropolitan region of Uusimaa.

Interestingly the results showed that the acceptance levels of all the extractives of interest were generally lower when the perspective was shifted from the level of Finland to the level of one's own home municipality. The drop in mean responses is the largest in the metropolitan region of Uusimaa. The most accepted in one's home municipality is the mining of precious metals, base metals and industrial minerals. The least accepted is the mining of uranium. The results generally show that attitudes toward the acceptance of uranium mining are the most critical and negative.

The attitudes toward the acceptance of mining for precious metals, base metals and industrial minerals in one's home municipality are more negative in the metropolitan region of Uusimaa than in the geographical categories "mining regions" and "other regions". Also, the attitudes toward the acceptance of mining for high tech –metals in one's home municipality are more negative in the metropolitan region (Uusimaa) than in the mining regions.

In relation to the benefits of mining, the creation of jobs for Finns was the most important perceived benefit from mining amongst respondents. The respondents from the mining regions agreed more strongly that mining creates jobs for Finns than those living in the metropolitan region of Uusimaa. The second most important benefit from mining was the opportunities that it provides for regional employment and training. The respondents from the mining regions also saw these opportunities more positively than respondents from the metropolitan region of Uusimaa.

On the other hand, when considering the negative impacts of mining the respondents most strongly agreed on the negative impacts of mining on water quality (both groundwater and surface water) and on the environment in general. These results possibly reflect the greatly publicized problems of the Talvivaara mine in the region of Kainuu in the management of its environmental issues.

In the interpretation of the results, it should be noted that there has been a thorough structural change in the Finnish society in recent decades. There has been a tendency for the population to concentrate in few growth centres and in rural areas the movement has been into the regional centres. This continued depopulation of rural areas have caused the degradation of the existing services and infrastructure and the deterioration of living conditions for those remaining. Migration has increased economic activity in the growth centres.³⁰ Characteristic to the mining regions in our data is that large parts of them are sparsely populated rural areas. According to Risku-Norja et al. (2010, 78), most of the sparsely populated rural areas are located in eastern and northern Finland and in these areas the challenges to regional development measured by various socioeconomic indicators are the greatest.

The respondents in all the geographical areas of interest were generally of the opinion that the economic benefits of mining aren't distributed fairly. However, mining communities were perceived to be more strongly receiving a fair share of the benefits of mining, especially when compared to personal perceived benefit from mining. There was also a sentiment that Finland as a nation doesn't receive a fair share of tax from the mining industry.

The results also showed a somewhat negative attitude toward foreign mining companies. This negative attitude toward foreign mining companies combined with the view that Finland as a nation does not receive a fair share of tax from the mining industry can be seen to reflect a resource nationalistic tendency in which the nation's mineral resources are seen as national wealth and the use of which should benefit our own country economically as much as possible.

Noticeably, in relation to procedural fairness the respondents in all the geographical areas of interest didn't generally feel quite strongly as being heard and respected by the mining industry, municipal government and state government. The perceptions on having opportunities to participate in decisions about mining weren't quite strong either.

The results also showed a lack of faith that the formal institutions are sufficiently able to influence the way mining takes place. The trust in officials' capability to monitor the environmental impacts of mining in Finland and the trust in Finland's environmental legislation in preventing mining from causing significant environmental and health hazards were also low.

We also asked the participants to rate their level of trust in the mining industry, municipal government, state government, and non-government organisations (NGOs). Two patterns emerged from the data. First, the levels of trust overall, for all actors, were low. Second, NGOs were the most trusted, with state and municipal governments second. Least trusted was the mining industry.

The results of the multiple regression analysis showed that significant predictors of acceptance of mining were impacts on environment, cost of living impacts, impacts on other sectors, benefits on regional transport infrastructure and social well-being and employment and other regional benefits.

The more negative respondents felt these impacts were, the less likely they accepted the industry; and the more positive respondents felt these benefits were, the more likely they accepted the industry.

The two strongest predictors of acceptance in the analysis were impacts on other sectors and employment and other regional benefits that flow from mining.

Together, the results of the path analyses indicate that building trust and acceptance of industry (i.e., a social licence) requires more than just the actions of either industry or governments alone – a social licence is dependent on these important parts of the mining industry working together.

This conclusion is strengthened especially by the relatively stronger relationship observed in both path models between governance capacity and trust in industry compared to that observed between governance

30 Risku-Norja, H., Voutilainen, O. & Yli-Viikari, A. (2010). Rural development in Finland: revival of a natural resource sectors perspective. *Society and Natural Resources*, 24 (1), 75–84.

capacity and acceptance. Also, there is a stronger relationship between distributive fairness and trust in industry when compared to the relationship between distributive fairness and acceptance in both models.

Finns trust and accept the industry more when they feel heard and respected by it, when it is responsive to their concerns, when benefits from mining are shared equitably, and when the municipal and state governments and the legislative and regulatory frameworks we have in place provide confidence that the mining industry will do the right thing.

From this data then, we can see that the Finnish public are more accepting of the mining industry in Finland when industry and government work together to build trust in the industry – holding a social licence to operate is, therefore, the responsibility of governments and industry working together with communities to promote effective, constructive, and mutually beneficial relationships.