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Institutional conditions for Swedish metal production: A comparison of subsidies to metal mining and metal recycling



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ABSTRACT

This article examines and contrasts the level of Swedish governmental subsidies to two different ways of producing metal: the metal recycling sector and the metal mining sector. In 2010, the metal mining sector was subsidized by € 40 million and the metal recycling sector € 0.6 million. If the exemption from landfill tax is considered a subsidy, the level of subsidization to the metal mining sector changes drastically to approximately € 4000 million. Regardless of how the concept “subsidy” is defined, the metal mining sector in total and per tonne of metal produced is fundamentally more highly subsidized than the metal recycling sector. The value added per tonne of metal produced for the metal recycling sector appears to be higher than for the metal mining sector. The current dominant trend in the Swedish mineral strategy is nevertheless to increase the level of subsidization to the metal mining sector.

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Introduction

For industrialization at least four metals are crucial: iron for construction, aluminum for transport, lead in batteries and copper to conduct electricity. In advanced technologies additional metals are used, for example in circuit boards or hospital instruments. Virtually all metals in the periodic table are used, and those not in use today probably will be tomorrow (UNEP, 2010). Since many sectors rely on metals, concerns have arisen for decreasing accessibility of metals due to reasons such as increased consumption, political instability, depletion, trade barriers and environmental externalities.

To secure the supply of metals, the European Commission (2008) has identified three different strategies in its Raw Materials Initiative: “(1) ensuring a level-playing field in access to resources in third countries; (2) fostering a sustainable supply of raw materials from European sources; and (3) boosting resource efficiency and recycling”. In the initiative, each member state is encouraged to develop a national mineral strategy. In February 2013, the Swedish Government (2013) presented the first ever Swedish mineral strategy. In the

national strategy, increased mining as well as recycling are stressed to meet the increased demand.

In principle, metals in the form of a commodity can thus be produced in two distinct ways: through primary or secondary production, i.e., through mining or recycling. Both production methods as stated in the policies will remain important in order to meet future demand. By analyzing flows of metals, researchers (e.g., Lichtensteiger, 2002; Elshkaki et al., 2004; Spatari et al., 2005; Gordon et al., 2006; Müller et al., 2006; Halada et al., 2009) have demonstrated that the current accumulation of metals in the technosphere is comparable to the remaining known reserves in the Earth's crust. Previous research has also shown that the concentration and availability of metals varies above ground, just like below ground. For example, above-ground metals may be concentrated in steel girders as well as dissipated from old satellites in the form of debris orbiting around the Earth (Johansson et al., 2013). However, less attention has been given to the institutional conditions, which influence market prospect and the feasibility of an industrial sector, for primary and secondary metal production.

The role of the government and the institutional conditions for the mining sector have been discussed and mapped in theoretical studies (Bridge, 2014) as well as case studies (Grudnoff, 2012). The notion that primary metal production has more favorable institutional conditions than secondary metal production is in many ways an accepted fact.

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But this idea is based on general observations. For example, Ayres (1997) has demonstrated how energy-intensive primary production is favored by low taxes on extractive resources and energy while labor-intensive secondary production is disadvantaged by high taxes on labor. Comprehensive comparison of the institutional conditions between these two sectors, mapping the extent of political commitment both in total and in relation to the importance of the sectors, is largely lacking.

Institutional conditions may appear in many different forms: governmental policies such as instruments as well as targets. In this study, institutional conditions will be considered in the form of subsidies, i.e., direct or indirect government support to a specific sector, since this type of support is well-studied and has a developed methodology. By analyzing subsidies, political support can be quantified, which facilitates the comparison between the sectors. Subsidies are typically adopted to obtain objectives such as lower prices, to promote equality or emerging alternative markets, and to increase domestic supply, employment and growth (Lin, 1996; Schwartz and Clements, 1999). Researchers have shown, however, that subsidies may have many negative and sometimes adverse side effects, such as impeding trade (Anderson and Martin, 2005), degrading the environment (Kleijn et al., 2001; Sterner, 2007; OECD, 2009), reducing economic efficiency (Tullock, 1975), establishing dependencies and lock-ins (Unruh, 2000; IEA et al., 2010), disrupting foreign markets, and increasing poverty and inequality (IFPRI, 2003; WRI, 2007).

The point here is not to study the impact of metal subsidization. Instead, the aim of the paper is to quantify and contrast subsidies between two sectors producing essentially identical products, for example as previously done between the fossil-fuel sector and the renewable energy sector (e.g., IEA, 2011; GSI, 2010), thereby indicating political priorities and commitment. Hence, in this case the Swedish subsidies to the metal mining sector and the metal recycling sector are identified, quantified and contrasted in order to examine the level of government action to meet the policy goals of increased primary and secondary metal production. However, determining the level of subsidies is a political issue. Assessing the level of subsidies between two similar sectors nevertheless has the potential to reveal governmental priorities and thereby allow for further policy discussion. In this paper, only subsidies provided at the national level are examined.

Method

The concept of subsidy can be defined in different ways, depending on the purpose and perspective. Common to all definitions is that subsidies are a financial contribution or benefit from the state towards a specific type of production or consumption. Subsidies can further be understood narrowly, which could be the case in statistical compilations (e.g., The Swedish Board of Agriculture, 2013), including subsidies only in the form of direct transfers from government to industry. However, according to Bruce (1990), such an approach ignores the fact that governmental support may be implicit and that policies may have other or hidden intentions but nevertheless result in support for specific industries. Therefore, subsidies are commonly defined more broadly, to also include for example tax breaks and trade barriers (e.g., SCB, 2010; SEPA, 2012b). Subsidy analysis of trade or policy usually also embraces more implicit financial benefits such as research grants and uncollected or under-collected resource rents (e.g., Milazzo, 1998; Steenblik, 2002; OECD, 2010a; Yeo et al., 2010; IEEP, 2012; Gerasimchuk, 2012; Aarsnes and Lindgren, 2012). An even broader definition, which is excluded in this analysis, would in the example of Pieters (1997) or Riedy (2003) include investment in general infrastructure or even the failure of government to act such as when it

allows polluters to impose costs on others (see, e.g., Clements et al., 2013).

The four types of subsidies

Since the objective of this article is to analyze the level of governmental commitment, the definition and framework from policy analysis will be used. The framework for policy analysis (e.g., Steenblik, 2002; OECD, 2010a; Jones and Steenblik, 2010) has been slightly modified to be better suited to metal production and four different types of subsidies are included: (i) direct transfers of funds; (ii) revenue forgone; (iii) indirect transfers of funds and services; and (iv) resource rent.

Funds transferred to a sector or industry can either be direct or conditional with obligations. Direct transfers are grants or capital contributions, for example to cover industrial losses, support exports or modernize an industry. Conditional transfers mean that they must be repaid unless certain conditions are fulfilled. Transfers of money are generally the most visible subsidy (Bruce, 1990; OECD, 2010a; Jones and Steenblik, 2010), but require accuracy to avoid double counting. Therefore, transfers have primarily been sought in the Swedish national accounts rather than budget proposals.

Revenues forgone primarily include different tax anomalies such as concessions, exemptions or reductions (OECD, 2010a; Jones and Steenblik, 2010). The value of the shortfall should, according to the WTO (1994), be estimated according to the extent to which government revenues are reduced, holding all other factors constant, i.e., the *revenue forgone method*. This method has become the most common comparative method to calculate tax shortfalls (OECD, 2010b; Jones and Steenblik, 2010; Swedish Government, 2011) and will thus be used in this paper. The disadvantage of this method is that behavioral changes as a result of higher taxes are excluded, which, however, could be difficult to quantify. The presented shortfall is thus most likely higher than the potential tax revenue from removing the tax breaks. Another form of revenue forgone may be government loans that do not have to be repaid under certain circumstances, or debt relief.

Explicit transfers and services may include research grants that benefit a particular sector or indirect governmental support through, for example, their agencies towards specific sectors. Government may furthermore sell something to industry at below-market price or buy something from industry at above-market price. Another example of services is when the state guarantees loans or becomes the creditor of a bank loan (which reduces the interest rate). In these cases, the subsidy will be calculated by the price gap between the bargain price or rate and the market price or rate.

The fourth type of subsidy to be analyzed is uncollected or under-collected resource rent, which arises when governments undercharge enterprises for preferential access to domestic natural resources. However, it is difficult to define the benchmark of the resource rent and the exact economic value of the natural resource, i.e., what should be a justified resource rent? Therefore, the level of subsidy for this category will not be calculated. Instead, this section will primarily present how the sectors access the resources, i.e., the primary and secondary metals.

Data collection

Information on subsidies has primarily been investigated by approaching the Swedish sector associations of secondary and primary metal production, i.e., *Återvinningsindustrierna* [the Swedish Recycling Industries Association] and *Svemin*, respectively. They have been asked if any of the above four categories of subsidies exist, and if so their scope. To broaden the investigation

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