

SAP 2.64/WP.115

SECTORAL ACTIVITIES PROGRAMME

Working Paper

The impact of climate change policies on employment in the coalmining industry

By Cain Polidano

(Australian Bureau of Agricultural and Resource Economics)

Working papers are preliminary documents intended to stimulate discussion and critical comments

International Labour Office Geneva

Contents:

[Summary](#)

[1. Introduction](#)

[2. Analytical framework](#)

[3. Policy simulation](#)

[4. Aggregate impact of policies on economies](#)

[Carbon leakage and structural change](#)

[Changes in labour demand from the coal industry](#)

[Changes in Annex I regional coal production](#)

[Changes in non-Annex I regional coal production](#)

[Changes in employment in the coal industry](#)

[5. Conclusions](#)

[Appendix: Coal demand changes](#)

[Annex I countries](#)

[Change in coal demand from the electricity sector](#)

[Change in coal demand from the iron and steel sectors](#)

[Non-Annex I countries](#)

[Change in coal demand from the electricity sector](#)

[Change in coal demand from the iron and steel sectors](#)

[References](#)

Summary

An agreement under the United Nations Framework Convention on Climate Change for developed countries to curb greenhouse gas emissions is in the pipeline. The impact on sectoral production from such an agreement is projected to be significant. In particular, lower fossil fuel use in Annex I countries, so that they can meet their emission abatement targets, is projected to result in a 30 per cent fall in global coal production at 2010 under the less stringent emission reduction scenario (Annex I countries stabilize their carbon dioxide emissions from fossil fuel combustion at 1990 levels by 2010) relative to the reference case of unabated emission growth. Global coal production is projected to fall by 42 per cent at 2010 under the more stringent (Annex I countries reduce their carbon dioxide emissions from fossil fuel combustion to 15 per cent below 1990 levels by 2010) relative to the reference case.

Falls in coal production lead inevitably to significant falls in coalmining employment. It is estimated that there will be between 1.5 million and 2.1 million fewer coalmining workers at 2010 under the less stringent and more stringent scenarios respectively, relative to the reference case.

A significant result from this paper is that, although non-Annex I regions are not required to undertake emission abatement action, trade links with Annex I regions result in lower non-Annex I coal production too. Non-Annex I coal production is projected to fall by about 8 per cent at 2010 relative to the reference case, as a result of Annex I abatement action. Annex I coal production is projected to fall by 43 per cent and 62 per cent at 2010 under the less stringent and more stringent emission abatement scenarios respectively, relative to the reference case.

With little substitution between labour and capital in the production of coal, especially in Annex I regions, changes in labour demand are projected approximately to mirror changes in coal production. It is projected, however, that the fall in non-Annex I labour demand (3 per cent at 2010 under the less stringent scenario relative to the reference case) will be less than the fall in coal production because of a small substitution away from capital, in favour of labour.

Changes in regional coalmining employment relative to the reference case depend on the number of workers employed in the coal sector and on the change in demand for labour in the coal industry arising from changes in production. For example, although the percentage decrease in labour demand in the former Soviet Union and Eastern European coal industries is relatively low, the projected number of jobs lost in these regions is the greatest among the Annex I regions because of the large workforce compared with other Annex I countries. Over 1.8 million workers are projected to be displaced at 2010 under the more stringent scenario relative to the reference case. In the European Union 295,000 coal workers are projected to be displaced at 2010 under the more stringent scenario (similar to the current proposal of the EU) as labour demand in the coal industry falls by 75 per cent relative to the reference case. In the United States, Australia and Canada the projected job losses are 115,800, 12,800 and 8,700 respectively.

The effect of emission abatement policies on regional coal production and labour demand also depends on the size of the negative trade effect. For instance, the negative trade effect is projected to result in over 17,000 workers being displaced from South African coal mines at 2010 under the more stringent scenario relative to the reference case, because South Africa exports a relatively large proportion of its coal production to Annex I regions. Alternatively, China and India export a very small proportion of their coal production, so that the positive domestic effect of carbon leakage is projected to be larger than the negative trade effect, resulting in a small increase in coalmining labour demand in these countries.

1. Introduction

Widespread concerns about the potential risks of global warming have motivated over 160 countries to become Parties to the United Nations Framework Convention on Climate Change. The Convention came into force in March 1994 with the aim of stabilizing the atmospheric concentration of greenhouse gases at a level that would prevent "dangerous anthropogenic interference with the climate system" (United Nations 1992).

A fundamental result of the Berlin Mandate, agreed at the first Conference of the Parties to the Framework Convention in 1995, was the commencement of negotiations to establish greenhouse gas emission reduction objectives and policies for Annex I countries for the period beyond 2000 (see box 1). The deadline for an agreement on these objectives and policies is the third Conference of the Parties to the Convention in Kyoto, Japan, in December 1997.

Under the Berlin Mandate the outcome of the current negotiating round will not require non-Annex I countries (developing countries) to adopt commitments to lower their emissions. Nevertheless, it can be expected that the economic development of non-Annex I regions will be affected through trade and investment links with Annex I parties. Non-Annex I countries are likely to be affected via these links when Annex I countries undertake emission abatement measures, with a consequential impact on their gross national expenditure. Estimates of the impact of emission reduction policies on Annex I economies can be found in Brown, et al. (1997). An important result from this research was that policies to reduce carbon dioxide emissions from fossil fuel combustion in Annex I regions lead to lower world demand for fossil fuels, especially coal which is highly emission-intensive. Further, details on non-Annex I countries can be found in Shneider, et al. (1997).

The aim of this report is to highlight the impact of Annex I country efforts to reduce carbon dioxide emissions from fossil fuel combustion on the demand for labour in the coalmining industry. Although unemployment is not explicitly modelled in this study, estimates are made of the number of workers that are likely to be displaced from the coal industry as a result of emission abatement policies.

The analysis presented in this report is based on applications of the MEGABARE model of the world economy (ABARE 1996). MEGABARE is a multi-commodity, multi-region, dynamic, computable general equilibrium model designed to conduct research on issues facing the global economy, including the impact of climate change policy (see, for example, Brown, et al. 1997). Documentation on the model, together with some working papers that illustrate its further development, can be found on ABARE's Internet site (<http://www.abare.gov.au>).

This report does not address the broader issue of assessing the overall cost of climate change itself compared with the cost of mitigation and adaptation. This subject is covered in the "environmental impact assessment" literature (see, for example, Weyant 1994; Weyant, et al. 1995; Reilly 1997). Also, only policies to abate carbon dioxide from fossil fuel combustion are considered in this report.



Updated by BR. Approved by OdVR. Last update: 28 September 2000.

For further information, please contact the Sectoral Activities Department (SECTOR)
at Tel: +41.22.799.7501, Fax: +41.22.799.7050 or email: sector@ilo.org

SECTOR: [[Top](#) | [SECTOR Home](#) | [About Sector](#) | [Sectors](#) | [Meetings](#) | [Publications](#) | [Contact us](#)]

International Labour Organization (ILO): [Contact us](#) | [Site map](#) |

