NORTH-HOLLAND

Journal of Policy Modeling
24 (2002) 751–779

Journal of Policy Modeling

Compliance costs to the Kyoto Protocol and market structure in Canada: a dynamic general equilibrium analysis[☆]

Yazid Dissou[a,*,1], Carolyn Mac Leod[b], Mokhtar Souissi[a,2]

[a] *CREFA, Université Laval, 33, Constellation, Hull, PQ, Canada J9A 3H5*
[b] *MEPA, Industry Canada, Ont., Canada KIA 0H5*

Received 1 November 2001; accepted 1 June 2002

Abstract

The US withdrawal from the Kyoto Protocol has exacerbated the policy debate that has been centered on the compliance cost in Canada. In contrast to previous studies, this paper uses a dynamic general equilibrium model with monopolistic competition to explore the consequences, in terms of compliance costs, of departing from perfect competition. While the simulation results show that a perfectly competitive framework can underestimate the welfare cost of compliance by as much as 30%, they also indicate that the market structure does not have a noticeable impact on the estimation of the annual Gross Domestic Product (GDP) costs.

JEL classification: C58; D58; Q28

Keywords: Compliance cost; Kyoto Protocol; Imperfect competition; Dynamic general equilibrium

[☆] Usual caveats apply. The views expressed in this document are those of the authors. They do not reflect those of the institutions they are affiliated with.

* Corresponding author. Tel.: +1-819-777-9732; fax: +1-819-777-9732.
E-mail addresses: dissouy@sympatico.ca, ydis@ecn.ulaval.ca (Y. Dissou), macleodc@canada.com (C. Mac Leod), m_souissi@videotron.ca (M. Souissi).

[1] This paper was written, while Yazid Dissou was at Industry Canada.
[2] This paper was written, while Mokhtar Souissi was at Industry Canada.

0161-8938/02/$ – see front matter
PII: S0161-8938(02)00173-4

1. Introduction

This paper explores the role that departure from perfect competition may play in the analysis the welfare and growth implications of Canada's compliance to the Kyoto Protocol. In December 1997, Canada agreed along with other 37 countries to take the most appropriate cost-effective measures to reduce its carbon dioxide equivalent emissions of GHG between 2008–2012 by 6% below 1990 levels.

Much of the policy debate on the ratification of the protocol in Canada has centered on the aggregate cost, and mainly on the Gross Domestic Product (GDP) cost, that this country would incur should it adopt GHG mitigation policies in line with the accord. Most of the recent estimates of this cost range from less than 1–2% in terms of annual GDP loss relative to Business as Usual (BAU), depending on the policy instruments used.[3] Strong pressure by environmentalist groups on the Canadian government to ratify the protocol is facing resistance by industrialists who argue that raising energy cost would impede the competitiveness of Canadian firms and would have negative impacts on output, employment and investment.

The concerns raised by these opponents have been exacerbated by the US decision not to ratify the Kyoto Protocol, given the close trade link between the two countries. Still, because the price of international permits will presumably decrease, due to the US withdrawal from the Kyoto process, recent study by Eyckmans and Tilkens (2001), among others, have concluded that the cost of GHG mitigation policies will fall in the countries that remain in the process.

However, opponents to the protocol still argue that Canada should not ratify the protocol because existing figures on the cost of implementing Kyoto are underestimated due to several reasons among which the two following related to the modeling framework. First, the fall of price of international permits due to the US withdrawal from the Kyoto process is not warranted, as the above-mentioned studies did not take into account the strategic behavior on the supply side of permit market by Former Soviet Union countries (FSU), i.e., Russia and Ukraine. Second, all existing studies on the costs of compliance to Kyoto Protocol in Canada assumed that firms behave competitively in their product markets. Answers to the first criticism related to the price international permits could be found in recent studies carried out by Manne and Richels (2001) and Böhringer (2001). Using multi-country models, these authors have concluded that the most likely strategic market behaviors of FSU will modify the expected change in the international price of permits from the US withdrawal from the Kyoto process. Consequently, Canada should not expect a lower international permit price, as a result of the US withdrawal from the Kyoto process. In contrast, and as far as we know, no study has addressed the second and most important criticism made by Kyoto opponents in relation the product market structure, which is an empirical matter.

[3] See for example, Ab Iorwerth et al. (2000), Wigle (2001, 2002).