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INTERNATIONAL TRADE AND FREIGHT TRANSPORTATION: PAST TRENDS AND PROSPECTS UP TO 2020

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NON-TECHNICAL SUMMARY

Have transportation costs played a key part in the growth of world trade for the past 30 years, and therefore, in the new wave of globalization? Is there a risk that an increase in the transportation costs during the next 20 years – due to carbon taxes and the rise in oil prices – will reduce world trade expansion and economic growth? This paper reviews past trends in international freight transportation and their impact on the growth of world trade; then it provides estimates of the impact of carbon taxes on transportation. The first section explains why transportation costs are difficult to measure and how their impact on international trade is estimated. The second section describes the growth of international freight transportation over the last 40 years. In the third section, we use the MIRAGE general equilibrium model to predict the impact on world trade and world growth of carbon taxes on transportation.

Section 1 shows how the difficulties which arise when identifying and measuring transportation costs generate uncertainty in the predictions of the impact of these costs on trade. Firstly, the effects of changes in transportation costs and in other barriers to trade must be successfully disentangled from one another. Secondly, variations in the transportation price must be balanced with the quality of the service (speed and security). Thirdly, fixed costs and economies of scale make it difficult to appreciate the impact of distance on transportation costs. Lastly, available data for the identification of these various effects are often incomplete and not detailed enough. The data source is either carrier companies, or the customs administrations. The customs data provide *ad valorem* freight rates, which are the most commonly used indicators for transportation costs.

Measuring the effect of transportation costs on trade draws on either geographical or chronological differences. The effect of transportation cost differences between countries are usually estimated indirectly, in the framework of gravity trade models; these methods may overestimate the transport cost effect, as they may not distinguish it perfectly from other effects of distance between countries. Evaluations based on variations of the transportation costs through time evidence quite small effects on trade over the past 40 years.

Section 2 brings together the main data showing the development of international transportation for the last 40 years. A number of innovations and their wide spread during the second half of the 20th century, enabled to increase speed and transported volumes per travel. Prominent examples are mass air transportation, or global management of integrated intermodal traffic nets thanks to new information and communication technologies. The data show that over the last 25 years, these innovations were of concern mainly for transportation of the manufactured goods. Bringing together all available data concerning the evolution of transportation prices, it follows that the decrease in freight rates is mainly due to the increase in the prices of transported goods. Actually, there has not been a general decrease in transportation tariffs over these years. But it can be argued that the substantial upgrading of the quality of transportation services, regarding speed and security, is equivalent to a price decrease. In parallel, a large part of freight transportation has become more intensive in energy, and consequently fuel prices represent a growing part of transportation costs.

Section 3 considers the sustainability up to 2020 of energy intensive international transportation, with the assumption of more active policies to tackle climate change. We represent the green house gases emissions mitigating policies in transportation by two alternative carbon taxes: a tax on imports based on the estimated CO_2 emissions of the international part of freight transportation only; and a tax on the CO_2 emissions of the whole transport sector, passenger and freight, domestic and international, including emissions from the production of inputs used in the transport industry. We provide evidence of the impacts of these alternative carbon taxes by using a customized version of the MIRAGE general equilibrium model. At the tax rates of $25 or $50 per ton of CO_2, the impact is small.