PART TWO

POLICIES FOR ADJUSTMENT AND GROWTH

CHAPTER 4

TECHNOLOGICAL ACTIVITY IN THE ECE REGION DURING THE 1990s

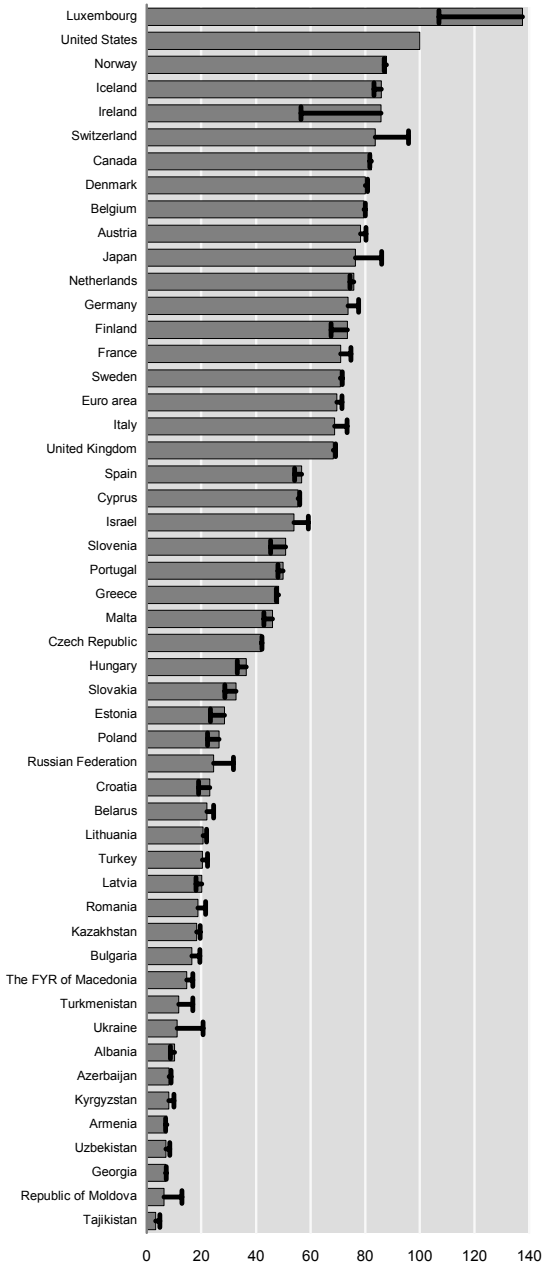
While the task of estimating the contribution of technical change to economic growth is fraught with difficulty, there is a clear positive relationship for the ECE region as a whole between variables such as the share of high-tech products in total exports and of educational expenditure and attainment levels on the one hand, and levels of GDP per head on the other. There is also a marked tendency in the developed industrial economies for gross expenditure on R&D (GERD) to increase over time as GDP increases. The relationship between GERD and GDP is obscured in the case of the transition economies by the fact that in the late communist period GERD was largely devoted (military purposes apart) to the maintenance of networks of research institutes, which made little or no contribution to economic development. The restructuring of these networks is still going on. As a result, formal R&D provided few inputs into the economic recovery recorded in the CEECs from the mid-1990s, and continues to weigh on the CIS countries as a dead weight loss rather than a source of benefits. R&D policy for the transition countries has to be developed against that specific background. Effective R&D policy may require further cuts in formal, public sector R&D expenditure, and should in any case be focused on developing the private sector's capacity to assimilate new technology, maximizing the technological impact of FDI, and helping to build supply networks as vehicles for technological upgrading.

4.1 Introduction

4.2 Convergence and divergence in per capita income levels in the 1990s

CHART 4.2.1

Real GDP per capita in current PPPs in the ECE region, 1993 and 2000
(United States=100)



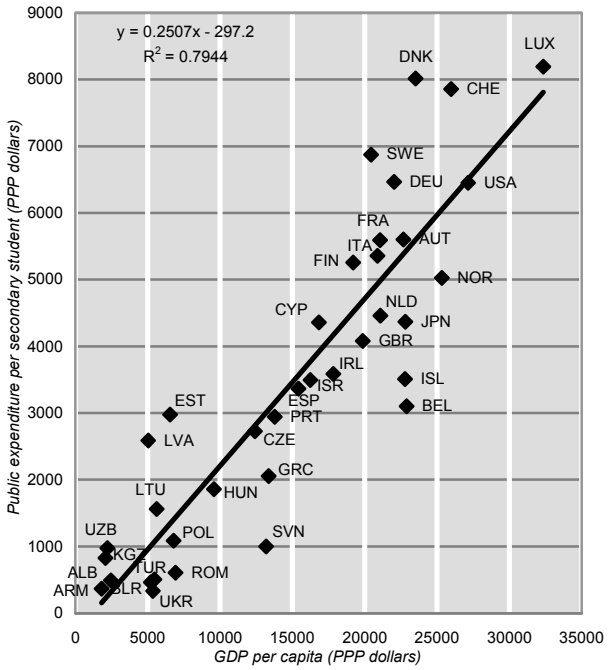
Source: UNECE calculation, based on World Bank, *World Development Indicators* (Washington, D.C.), 2002.

Note: The relative position of countries in 1993 is shown by the solid lines (see text).

4.3 Education and technological learning

CHART 4.3.1

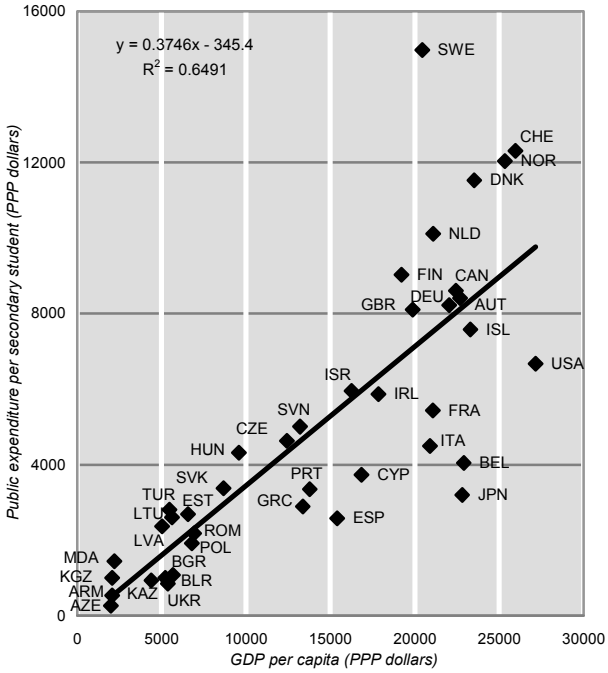
Public expenditure per secondary student in relation to GDP per capita in the ECE region, 1995



Source: UNECE calculation, based on World Bank, *World Development Indicators* (Washington, D.C.), 2002.
Note: As for chart 4.2.2.

CHART 4.3.2

Public expenditure per tertiary student in relation to GDP per capita in the ECE region, 1995

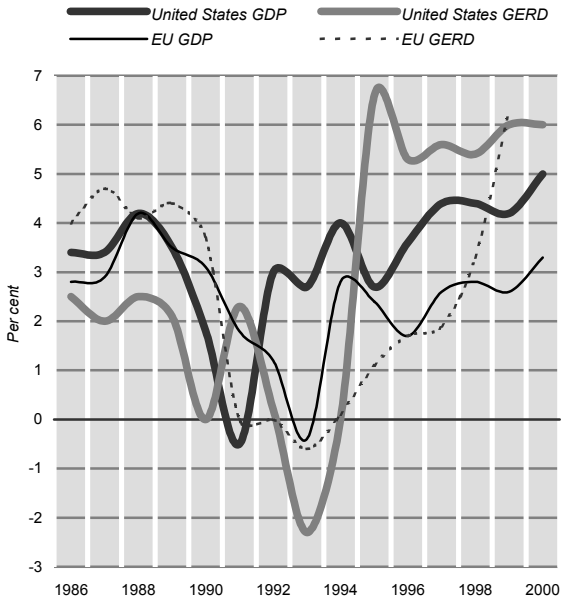


Source: UNECE calculation, based on World Bank, *World Development Indicators* (Washington, D.C.), 2002.
Note: As for chart 4.2.2.

4.4 R&D activity in the ECE region during the 1990s

CHART 4.4.1

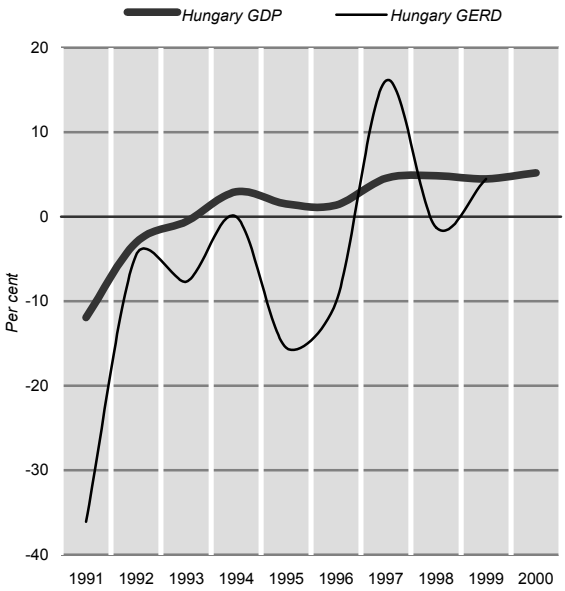
Real GDP and GERD growth rates in the European Union and the United States, 1986-2000



Source: UNECE calculation, based on Eurostat, New Cronos Database; OECD, *Main Science and Technology Indicators*, Vol. 2001, Issue 2 (Paris), 2001; UNECE Common Database.

CHART 4.4.2

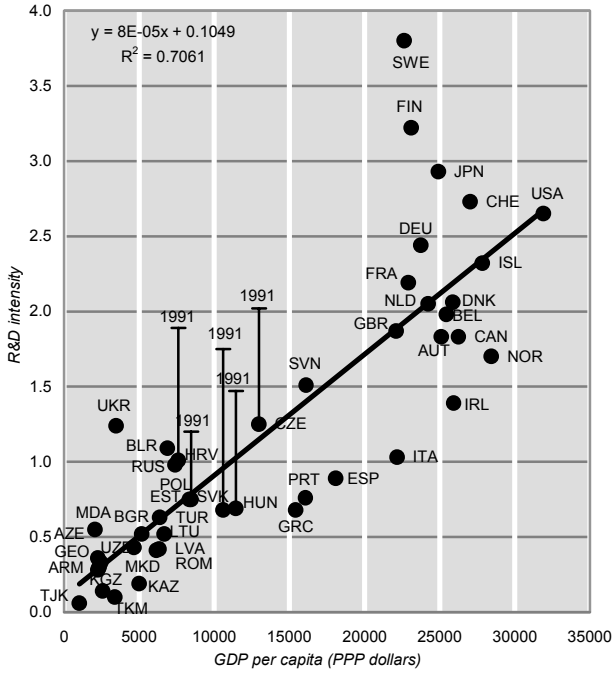
Real GDP and GERD growth rates in Hungary, 1991-2000



Source: UNECE calculation, based on OECD, *Main Science and Technology Indicators*, Vol. 2001, Issue 2 (Paris), 2001 and UNECE Common Database.

CHART 4.4.3

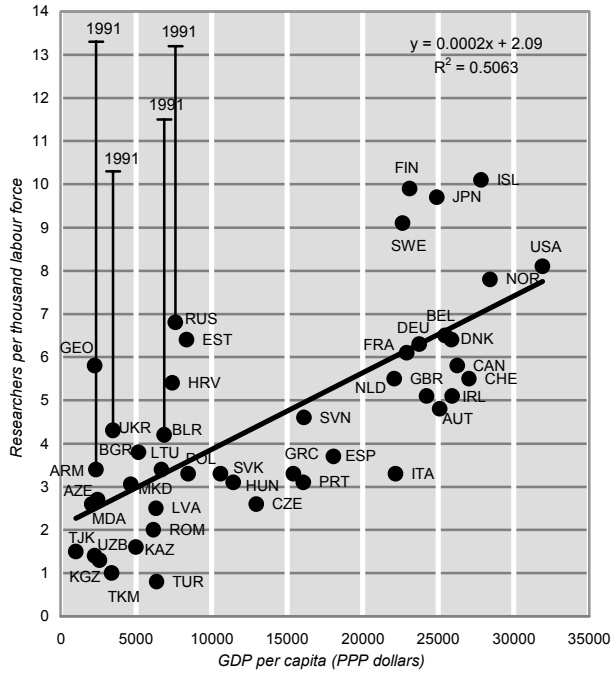
Research intensity and GDP per capita in the UNECE region, 1991 and 1999



Source: UNECE calculation, based on OECD, *Main Science and Technology Indicators*, Vol. 2001, Issue 2 (Paris), 2001 and UNECE Common Database.
Note: As for chart 4.2.2.

CHART 4.4.4

Researchers per thousand of the labour force and GDP per capita in the ECE region, 1991 and 1999

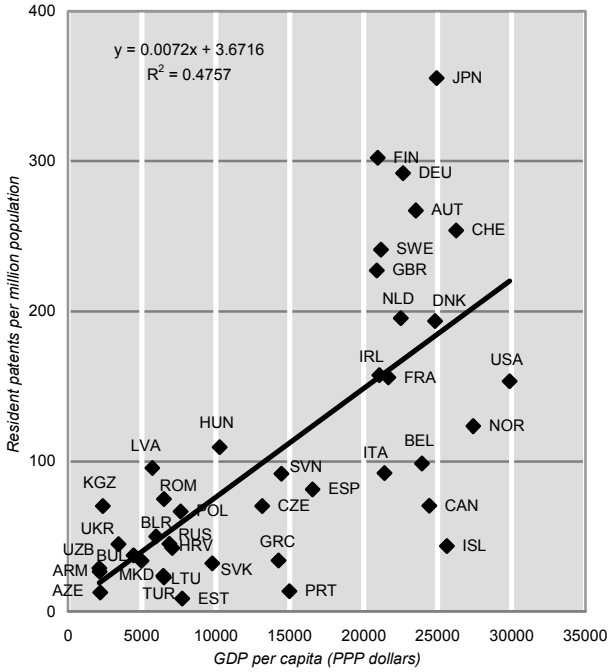


Source: As for chart 4.4.3
Note: As for chart 4.2.2.

4.5 Inventive activity in the ECE region

CHART 4.5.1

Resident patents per million of the population and per capita GDP in the ECE region, 1996-1998 average



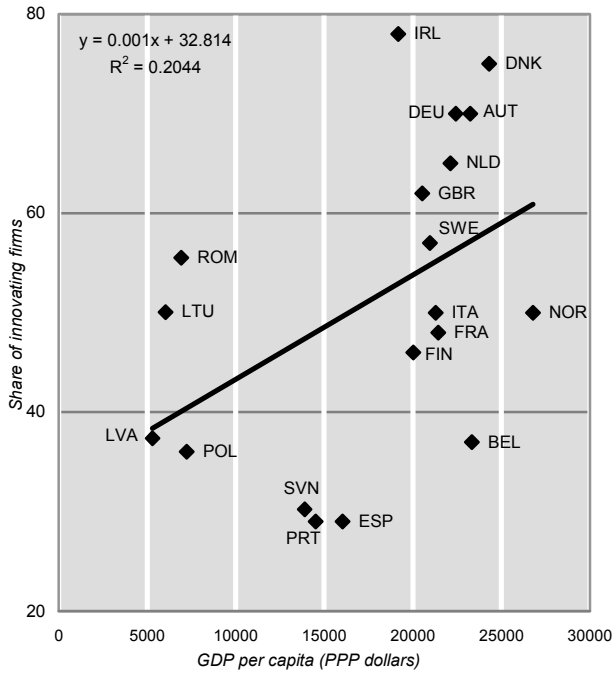
Source: UNECE calculation, based on World Bank, *World Development Indicators* (Washington, D.C.), 2002 and OECD, *Main Science and Technology Indicators*, Vol. 2001, Issue 2 (Paris), 2001.

Note: As for chart 4.2.2.

4.6 Innovative activity in Europe

CHART 4.6.1

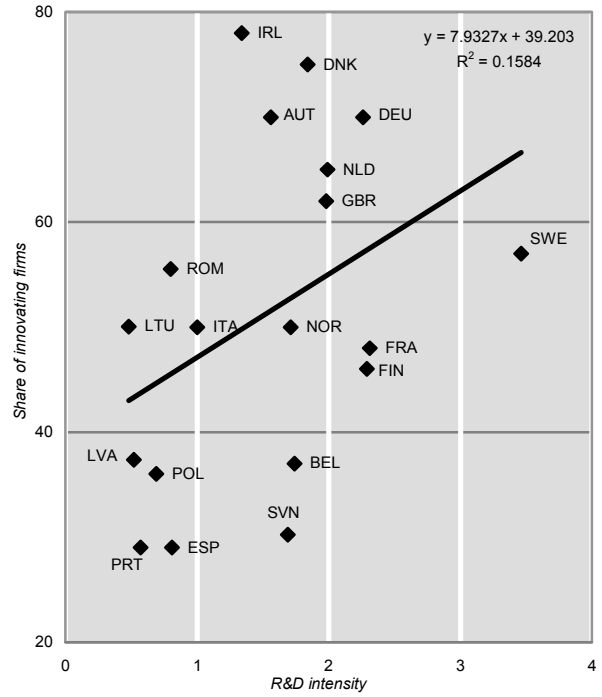
Manufacturing innovation and per capita GDP in Europe, 1996



Source: UNECE calculation, based on World Bank, *World Development Indicators* (Washington, D.C.), 2002 and Eurostat, New Cronos Database.
Note: As for chart 4.2.2.

CHART 4.6.2

Manufacturing innovation and R&D intensity in Europe, 1996

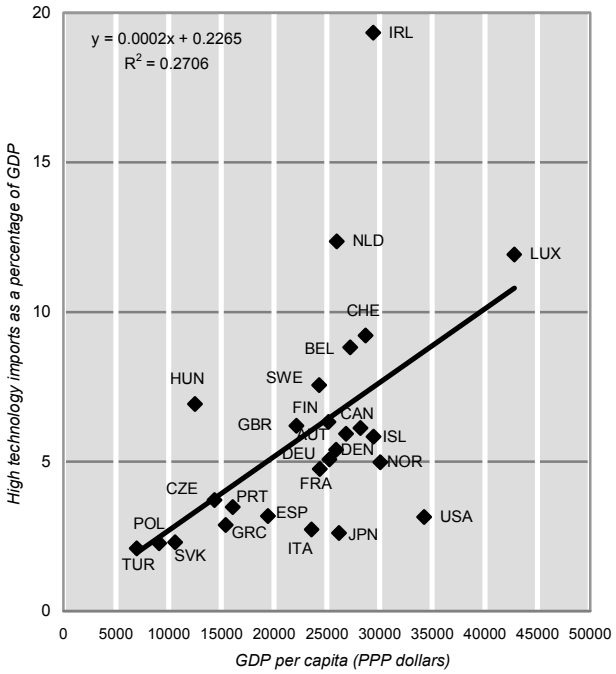


Source: UNECE calculation, based on OECD, *Main Science and Technology Indicators*, Vol. 2001, Issue 2 (Paris), 2001 and Eurostat, New Cronos Database.
Note: As for chart 4.2.2.

4.7 International technology transfer and domestic spillovers in eastern Europe

CHART 4.7.1

High-technology imports and per capita GDP in the ECE region, 1999



Source: UNECE calculation, based on World Bank, *World Development Indicators* (Washington, D.C.), 2002 and OECD, *Main Science and Technology Indicators*, Vol. 2001, Issue 2 (Paris), 2001.

Note: As for chart 4.2.2.

4.8 Is there a role for science and technology policy?