Regional Technological Distance and Catching Up

M.J. Oude Wansink
Department of Economics
University of Maastricht, The Netherlands
e-mail: m.oudewansink@algec.unimaas.nl

J.A.H. Maks
Department of Economics
University of Maastricht, The Netherlands
e-mail: h.maks@algec.unimaas.nl

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Abstract

A convenient way to find out how things are going is by taking a look at your neighbours. In this paper we develop a method for the evaluation of regional economic performance based on an input-output (IO) framework. Once we defined economic criteria for measuring this performance, such as real GDP per worker or employment per output unit, we pick out the 'best' performing region per sector. Taken together, they describe an optimal regional industrial structure for all sectors, a so called 'optimal' input coefficients table. On the basis of this table, we will investigate the causes of regional convergence. Furthermore, this table will be used as a point of reference for economic policy makers at the regional level. Structural deviations from the 'optimal' industrial structure may be reasons for policy action, so that the industrial structure can be evaluated in a normative way. In this paper, we investigate those deviations for 11 regions and 29 sectors in the Netherlands for the 1980-1992 period. The central focus is on the question how regional policy makers can improve regional economic performance by stimulating adjustments in the regional industrial structure.

1. Introduction

A convenient way to find out how things are going is by taking a look at your neighbours. In this paper we develop a method for the evaluation of regional economic performance based on an input-output (IO) framework. Once we defined economic criteria for measuring this performance, such as real GDP per worker or employment per output unit, we pick out the 'best' performing region per sector. Taken together, they describe an optimal regional industrial structure for all sectors, a so called 'optimal' input coefficients table. On the basis of this table, we will investigate the causes of regional convergence. Furthermore, this table wil be used as a point of reference for economic policy at the regional level. Structural deviations from the 'optimal' industrial structure may be reasons for policy action, so that the industrial structure can be evaluated in a normative way. In this paper, we investigate those deviations for 11 regions and 29 sectors in the Netherlands for the 1980-1992 period. The central focus is on the question how regional policy makers can improve regional economic performance by stimulating adjustments in the regional industrial structure.

The organization of the paper is as follows. In section 2, we present the regional structure of the Netherlands and discuss the data. In section 3, we concentrate on regional convergence in the Netherlands in the 1980-1992 period. In section 4, we discuss our (input-output) approach to regional convergence. We test our approach by using (the growth of) real GDP per worker in section 5. Section 6 concentrates on regional industrial structures and policy implications. Section 7 summarizes and concludes.

2. Regional Structure and Data

In Figure 1 (next page), we depicted the map of the Netherlands, divided in 12 regions.[1] Each region is partly autonomous in defining its own economic policy. We consider this choice of regional aggregation, based on the ability of regional policy makers to influence the economical situation in their region, suitable for the evaluation of possible causes of regional convergence. For each region, we have data available for 29 business sectors: 1 agricultural sector, 13 industrial sectors and 15 services sectors (see Annex 1 for more details). Our economic indicator, real GDP per worker (full time equivalents), is obtained from data of the Dutch Central Bureau of Statistics (CBS, *Regionaal Economische Jaarcijfers* and *National Accounts*) and the Dutch Central Planning Bureau (CPB, *Lange Termijn Reeksen*).

Figure 1
Regional Structure of the Netherlands

Input-output data are obtained from the input-output tables constructed by Oude Wansink and Maks (1998). We use the input-output tables that are constructed by applying the symmetric adjustment method (Oude Wansink and Maks, 1998).

3. Regional Convergence in the Netherlands

The geographical and political organization of the United States and European Union give rise to the analysis of regional economical convergence. In the US, the analysis focusses on the economic development seperate states, whereas the European integration give rise to the evaluation of economic development of the EU members. It can be argued that integration leads to (income) convergence between member states or regions.

Barro and Sala-i-Martin (1995) present the following arguments in support of this view: "Firms and households of different regions within a single country tend to have access to similar technologies and have roughly similar tastes and cultures. Furthermore, the regions share a common central government and therefore have similar institutional setups and legal systems. [...] Another consideration in the study of regions is that inputs tend to be more mobile across regions than across countries. Legal, cultural, linguistic, and institutional barriers to factor movements tend to be smaller across regions within a country than across countries." (p. 382-383)

Barro and Sala-i-Martin (1991, 1992) distinguish between β- and σ-convergence. In the former case, "convergence applies if a poor economy tends to grow faster than a rich one, so that the poor country tends to catch up with the rich one in terms of the level of per capita income or product." (Barro and Sala-i-Martin (1995), p. 383) The latter case "concerns cross-sectional dispersion. In this context, convergence occurs if the dispersion -measured, for example, by the standard deviation of the logarithm of per capita income or product across a group of countries or regions- declines over time." (Barro and Sala-i-Martin (1995), p. 383)

In Figure 2 (next page), we use these data to picture the annual growth rate and the initial (1980) level of real GDP per worker for 11 Dutch regions. We have no 1980 and 1985 data for Flevoland, so this region is excluded from our analysis. We have also put the growth-level combination for the Netherlands (NL) as a whole in the figure. From Figure 2, a negative relation between the initial level and the growth rate of (real) GDP per worker can be discovered. This negative relation supports the hypothesis of β-convergence: poor regions grow faster than rich regions. An ordinary linear regression through the points in Figure 2 leads to the following estimated relation between the growth rate and the initial level of GDP

$$g_{(Y/L)} = 5.43 - 4.56\,(Y/L)_0 \qquad R^2 = 0.58$$

where $g_{(Y/L)}$ is the growth rate and $(Y/L)_0$ stands for the *relative* initial level of (real) GDP per worker.[2] The negative, statistically significant coefficient in the regression equation supports the β-convergence hypothesis.[3] For the purpose of comparison, we refer to a result by Baumol (1986), who investigated β-convergence between main industrial countries during the 1870-1979 period. His result can be described by the following equation

$$g_{(Y/L)} = 3.25 - 0.75\,(Y/L)_0 \qquad R^2 = 0.88$$

Here, the initial level of GDP per worker is taken relatively to the level of the USA.