

Abstract

This thesis deals with various aspects of the relationship between knowledge and economic growth. It contains a general introduction and five separate essays.

Essay I is a literature overview on the appearance of knowledge in modern growth theory. The growth theoretic modeling setups are analyzed in relation to some fundamental notions in epistemology and the philosophy of science. My results suggest that although some important insights have been made in growth theory - for instance the distinction between propositional and procedural knowledge and between knowledge gained by experience and by education - the links to the epistemological tradition are still weak and logical problems involved in the construction of a knowledge variable of ideas, still persist. Future growth modeling might benefit from empirical patent research at the micro level.

Essay II presents a two-sector growth model of a regional economy with a university, that might be engaged in both education and research, and a manufacturing sector which benefits from the knowledge spillovers from the university. We derive the steady state level of consumption and utility for a human capital producing university region. The paper analyzes the effects of various policy measures taken by a benevolent regional planner. The most important policy areas for increasing regional welfare are the creation of efficient channels of human communication, improving the industry relevance of education at the university, and strengthening the rate of non-university learning by supporting a strong civic society.

Essay III is an extension of the model in Essay II. It describes the university investment decision in a peripheral region when basic knowledge is assumed to be a local public good with positive spillovers to other regions. The investment decision is analyzed in three different policy environments. A general conclusion is that endogenous university creation is more likely the more geographically peripheral the region and the worse its channels of communication.

Essay IV suggests a model of knowledge, seen as a set of ideas defined in a multi-dimensional idea space. Knowledge is created through convex combinations of older ideas and through paradigm shifts. When normal science has made the knowledge set convex, scientific opportunity is exhausted. The growth of a country's knowledge depends on diffusion from other countries, on own production, and on the state of its human capital and institutions. In the long run, economic growth will depend on knowledge growth, but only paradigm shifts can save R&D from diminishing returns.

Essay V concludes the thesis. The transition from a hunter-gatherer economy to agricultural production, which made possible the endogenous technological progress that ultimately led to the industrial revolution, is one of the most important events in the thousands of years of humankind's economic development. In this paper we present theory and evidence showing that exogenous geography and initial condition biogeography exerted decisive influence on the location and timing of transitions to sedentary agriculture, to complex social organization and, eventually, to modern industrial production. Evidence from a large cross-section of countries indicates that the effects of geographic and biogeographic endowments on contemporary levels of economic development are still remarkably strong.

Keywords: Growth theory, knowledge, human capital, technology, university policy, biogeography, epistemology, long-run development, game theory, set theory, production functions

Ola Olsson, Department of Economics, Göteborg University, 405 30 Göteborg, Sweden. Tel. 031-773 1000. email: Ola.Olsson@economics.gu.se.

ISBN 91-88514-59-5