The role of knowledge has traditionally not played a large role in economics. Certainly the insights of the great classical economists, such as Adam Smith, focused on the allocation and distribution mechanisms of the economy, as well as the roles of capital, labor and land, while paying only nominal attention to knowledge as an economic phenomenon. Writing in the post-war era, Robert Solow followed in this classical tradition. Solow (1956) based his model of economic growth on the neoclassical production function with its key factors of production – capital and labor. Solow, of course, did acknowledge that knowledge contributed to economic growth, but in terms of his formal model, it was considered to be an unexplained residual, which “falls like manna from heaven.” A generation of economists subsequently relied upon the model of the production function as a basis for explaining the determinants of economic growth.

The focus on labor and capital as the primary factors of production, and the general exclusion or trivialization of the role of knowledge, was not limited only to the sphere of macroeconomics. The most compelling theories of international trade were based on factors of capital and labor (and sometimes land). For example, the fundamental theorem for international trade, the Heckscher-Ohlin theory, later extended to the Heckscher-Samuelson-Ohlin model focused on the factors of land, labor and capital. According to the Heckscher-Ohlin theory, the proportion of productive factors determines the trade structure. If there exists an abundance of physical capital relative to labor, a country will tend towards the export of capital-intensive goods; an abundance of labor relative to physical capital leads to the export of labor-intensive goods. In fact, what became known as the Leontief Paradox, was based on the statistical evidence refuting, or at least not consistent with the Heckscher-Samuelson-Ohlin model. In particular, the Leontief Paradox...
pointed out that the actual patterns of U.S. trade did not correspond to the predictions of the model (Bowen, Leaner, and Sveikauskas, 1988). Rather than import labor-intensive goods and export capital-intensive goods, systematic empirical evidence found exactly the opposite for the U.S., which suggested that the comparative advantage for post-war U.S. was based on (unskilled) labor rather than on capital.

As economists struggled to resolve the Leontief Paradox, they began shifting the perspective of the model from an exclusive focus on the factors of inputs of capital and labor, to probing inclusion of various aspects of knowledge. Early extensions included human capital and skilled labor, and technology. The neo-technology theories focused on the role of R&D and the creation of new economic knowledge in shaping the comparative advantage and flows of foreign direct investment. Gruber et al. (1967) suggested that R&D expenditures reflect a temporary comparative advantage resulting from products and production techniques that have not yet been adapted by foreign competitors. Thus, industries with a relatively high R&D component are considered to be conducive to the comparative advantage of firms from the most developed nations.

The human skills hypothesis extended the Heckscher-Ohlin theory by including human capital as a third factor (Keesing, 1966 and 1967). In the presence of a relative abundance of a labor force with a high level of human capital, countries were found to export human capital-intensive goods. Similarly, the abundance of skilled labor tended to promote the export of skill-intensive goods.

The introduction of knowledge into macroeconomic growth models was formalized by Romer (1986) and Lucas (1988). Romer’s (1986) critique of the Solow approach was not with the basic model of the neoclassical production function, but rather what he perceived to be omitted from that model – knowledge. Not only did Romer (1986), along with Robert E. Lucas (1988) and others argue that knowledge was an important factor of production, along with the traditional factors of labor and capital, but because it was endogenously determined as a result of externalities and spillovers, it was particularly important.

There are two assumptions implicit that drive the results of the endogenous growth models. The first is that knowledge is automatically equated with economic knowledge. In fact, as Arrow (1962) emphasized, knowledge is inherently different from the traditional factors of production, resulting in a gap between knowledge and what he termed as economic knowledge, or economically valuable knowledge. The second involves the assumed spillover of knowledge. The existence of the factor of knowledge is equated with its automatic spillover, yielding endogenous growth.

The purpose of this volume is to contest both of these assumptions and to suggest that the spillover and flow of knowledge is not at all automatic. Instead, this volume suggests that a filter exists between knowledge and its