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New Economy

The German Perspective

Heft 70

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Rheinisch-Westfälisches Institut für Wirtschaftsforschung

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Preface

For many observers the beginning of a dynamic economic and stock market upswing in the U.S. in the mid 1990s marked the start of a new era, the times of the *new economy*. This phenomenon has been under intense discussion ever since – both in the political arena as well as among scientists. Thereby the somewhat glamorous term *new economy* reflects the conviction held by its proponents that the use of new technologies will lead to a never ending acceleration of technological progress and economic welfare.

The origins of this development date back a long time: More than 30 years ago, the starting point was the basic innovation "digitilization". Production as well as application of information and communications technologies (ICT) are based on this principle. At the beginning of the seventies, the first microprocessor was produced. Some ten years later, the first personal computer was brought onto the market. The commercial use of the Internet has begun in the mid nineties. In view of the economic boom in the U.S. accompanying the introduction of the Internet, the question arises as to what extent the *new economy* actually has exerted lasting positive effects on productivity – not only in the United States, but also worldwide.

Inspired by these developments, the Federal Ministry of Economics and Technology commissioned RWI, Essen, to study the driving forces of the *new economy*. In this report, the trends of the ICT sector and of the use of ICT products are analyzed with respect to the overall economic effects in Germany in comparison to the U.S. Further analyses were carried out regarding the intensity and effects of *e-business*. Finally, the influence of different methods of price measurement on productivity was analysed, since this is important for international comparisons of total factor productivity. The study culminates in a growth accounting calculation separating the contributions to economic growth by capital, labor, and technological progress.

The study was conducted by RWI's research group "Industrial Organisation and Industry Studies" in close co-operation with Prof. *Robert J. Gordon* (NBER and Northwestern University). Professor Gordon is one of the most

eminent experts in matters of the *new economy*. The project was directed by Klaus Löbbe. Preliminary results were presented and discussed by experts on November 9, 2001 during a workshop organized by the Federal Ministry of Economics and Technology in Berlin. The study was finished in 2002. Prof. *Francesco Daveri* (University of Parma), an acknowledged scientist in the empirical analysis of the effects of the *new economy*, provided useful comments in the course of this publication's preparation. We heartily thank him, as we do Professor Gordon and all other researchers involved in this study.

Essen, June 2003

Rheinisch-Westfälisches Institut
für Wirtschaftsforschung

Christoph M. Schmidt

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Introduction

Already since the beginning of the year 2001, and even more so since the terror attacks in the United States in early September, economic growth has been declining in most parts of the world. The decline ends, at least temporarily, a long lasting phase of accelerated growth. This protracted growth had contributed to a rapidly rising real income and the creation of a great number of attractive jobs in the U.S. and some other countries for several years. The associated combination of accelerated growth and monetary stability was often addressed as the emergence of a "new economy" (see, e.g., Bosworth, Triplett 2000; Bryson 2001; David 2001; Jorgenson, Stiroh 2000b; Nordhaus 2001a; Oliner, Sichel 2000). This new era was supposed to lead the U.S. to yet another "golden age" of growth and full employment, making the stagflation of the seventies and the productivity slowdown of the eighties as a forgotten historical episode. Many observers assumed that the driving force of this "new economy" – primarily the development and the increasing diffusion of new technologies, especially the information and telecommunications technology (ICT) – would lead to an ever accelerating factor productivity and the creation of new jobs, to low inflation and increasing "sustainable" real income.

However, the existence of a "new economy" in the U.S. is not an undisputed fact. In the U.S.-American literature there is an intensive discussion about the role of cyclical components and capital deepening on the one hand, and the contribution of technical progress (or total factor productivity) and falling ICT prices on the other hand (see, e.g., Blinder 2000; Davies et al. 2000). Lower restrictions regarding trade in goods and capital, an investment-friendly environment and a willingness to foster intensive competition, the associated adaptations of corporate structures, a skilful macroeconomic policy (a good mix between fiscal consolidation and countervailing monetary policy) and singular events (so-called peace bonus, drop in raw materials prices) are also important for the existence of the "new economy". Last but not least there was a debate in the U.S. economic literature about the appropriate calculation and statistical determination of labor and total factor productivity, qualifying the large growth figures to some extent (see, e.g., Boskin et al. 1996; Gordon 1999d; Triplett 2001).

From the European, and especially the German perspective, further factors that could have contributed to economic growth and employment should be pointed out. One can refer to the extension and more intense implementation of the European Community, the reunification of Germany and some structural reforms, such as the deregulation of several sectors, the privatization of public enterprises, reforms in public procurement and the creation of new instruments for business finance (Neuer Markt and venture capital, e.g.). These changes in the legal and institutional framework and structural reforms might also have contributed to the accelerated change in sectoral structures, numerous mergers and acquisitions and the creation of new enterprises. All this resulted in a higher degree of competition and a greater share of small and medium- sized enterprises. Nevertheless, during the nineties economic growth in most European countries was modest – and proved not sufficient in reducing the high unemployment rate. Under these conditions, the debate about the "new economy" in the U.S. was observed more and more carefully in most European countries.

At first glance, the attractiveness of the "new economy" concept has decreased markedly since the bursting of the speculative bubble on the stock markets (especially the Nasdaq Market and the Neuer Markt). But one should bear in mind that the connection between both phenomena is weak: While at the micro-economic level the valuation of individual companies is at issue, at the macro-economic level it is the development of total factor productivity which is of interest. Yet, up- and downswing of the NASDAQ or the Neuer Markt since 1997 reflect at least the changing role of technical progress.

For these reasons, a detailed analysis of the "new economy" and its components is still necessary. This requires – first of all – a theoretically sound, but practicable definition of the term "new economy". Following the recent literature (OECD 2001b), this study classifies an economy as a "new economy", if there is a remarkable acceleration of real growth in total output, value added, employment and/or labor productivity that can be mainly attributed to

- an improved quality of labor measured as an increase in educational attainment or in the level of post-secondary skills,
- an extended use of physical capital, above all ICT capital, and
- a rising multi-factor productivity (MFP), that is an increase in production and/or productivity which exceeds the gains resulting from intensified utilization of intermediate inputs or production factors (labor or capital).

Empirically, the MFP is usually calculated as the residual of a production function estimate. This procedure requires numerous, and partly restrictive, assumptions. Its main focus is necessarily on the long-run development of the economy, over and above its cyclical up- and downswings. The factors that may

have caused an increase in MFP are (1) an accelerating technological progress, (2) a higher degree of competition which pushes prices closer to marginal costs, or (3) a rising efficiency in the overall production and distribution process, either by the introduction of new organizational methods in management or by the use of new techniques (e.g., ICT techniques).

Against this background a comparative study is conducted on the importance of the phenomenon of the "new economy" and its driving forces in the United States and in Germany. In this context, the following questions need to be answered:

- Does the recent acceleration in the growth of U.S.-productivity really imply a fundamental change in the long-lasting trend of a protracted productivity slowdown? Which differences exist between the United States and Germany, with respect to long-term economic growth and employment, factor productivity and inflation? Which U.S.-German differences can be observed across the different sectors of the economy?
- How can these differences be explained? What is the importance of technological, cyclical and statistical (new methods for price measurement, calculation of nominal or real input and output figures etc.) factors for this change?
- Is ICT really a basic technology in the sense that it fundamentally alters the production process in the overall economy? Alternatively, are the production and productivity effects only confined to the ICT-sector?
- Do the general and sector-specific economic advantages arising from ICT correspond to those experienced during earlier technological revolutions (rise of the railways, widespread use of electricity and the automobile)? Based on historical experience, how long does it usually take for new technologies to diffuse into the German economy? What is the realistic time scale for catching up with the U.S. economy in terms of ICT penetration?
- Are there spillover effects from the ICT-sector into the remaining sectors of the economy? In which way do ICT-technologies change the internal production processes and the organization of work in the various sectors and/or firms? Which role do the new technologies play in the optimization of production processes as well as for the reduction in transaction costs (B2B, B2C)?
- What is the structural framework and which are the supporting macroeconomic policies that will foster the further development of the "new economy"? Could more intense efforts by economic, social, educational and research policy help Germany to catch up to other economies, particularly to the United States?