


Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)



## *Economic Growth in Europe*

Why has European growth slowed down since the 1990s while American productivity growth has speeded up? This book provides a thorough and detailed analysis of the sources of growth from a comparative industry perspective. It argues that Europe's slow growth is the combined result of a severe productivity slowdown in traditional manufacturing and other goods production, and a concomitant failure to invest in and reap the benefits from Information and Communications Technology (ICT), in particular in market services. The analysis is based on rich new databases including the EU KLEMS growth accounting database and provides detailed background of the data construction. As such, the book provides new methodological perspectives and serves as a primer on the use of data in economic growth analysis. More generally, it illustrates to the research and policy community the benefits of analysis based on detailed data on the sources of economic growth.

MARCEL P. TIMMER is Professor of Economic Growth and Development and Director of the Groningen Growth and Development Centre (GGDC) at the University of Groningen.

ROBERT INKLAAR is Assistant Professor in the Department of International Economics and Business at the University of Groningen.

MARY O'MAHONY is Professor of International Industrial Economics at Birmingham Business School at the University of Birmingham.

BART VAN ARK is Chief Economist of the Conference Board, New York, and Professor of Economic Development, Technological Change and Growth at the University of Groningen.

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

# Economic Growth in Europe

A Comparative Industry Perspective

MARCEL P. TIMMER

ROBERT INKLAAR

MARY O'MAHONY

BART VAN ARK



CAMBRIDGE  
UNIVERSITY PRESS

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

CAMBRIDGE UNIVERSITY PRESS

Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore,  
São Paulo, Delhi, Dubai, Tokyo, Mexico City

Cambridge University Press

The Edinburgh Building, Cambridge CB2 8RU, UK

Published in the United States of America by Cambridge University Press, New York

[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9780521198875](http://www.cambridge.org/9780521198875)

© Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark 2010

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2010

Printed in the United Kingdom at the University Press, Cambridge

*A catalogue record for this publication is available from the British Library*

*Library of Congress Cataloguing in Publication data*

Economic growth in Europe : a comparative industry perspective /

Marcel P. Timmer . . . [et al.].

p. cm.

Includes bibliographical references and index.

1. Europe – Economic conditions – 20th century – Case studies.

2. Europe – Economic conditions – 21st century – Case studies.

3. Industrial policy – Europe – Case studies. 4. Technological

innovations – Economic aspects – Europe – Case studies.

I. Timmer, Marcel. II. Title.

HC240.E273 2010

338.94 – dc22 2010023577

ISBN 978-0-521-19887-5 Hardback

---

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication, and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

---

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

## Contents

<i>List of figures</i>	page vii
<i>List of tables</i>	x
<i>Preface and acknowledgements</i>	xiii
1 Introduction and overview	1
1.1 Introduction	1
1.2 Perspectives on Europe's falling behind	3
1.3 Growth accounting	5
1.4 Book summary and contribution	9
1.5 Concluding remarks	16
2 Economic growth in Europe	18
2.1 Introduction	18
2.2 European and US productivity growth since 1950	19
2.3 Growth accounting for Europe and the United States	24
2.4 Structural change and the European slowdown	30
2.5 Market services and the growing EU-US gap	34
2.6 Increasing European diversity	38
2.7 Concluding remarks	44
3 EU KLEMS database	46
3.1 Introduction	46
3.2 Growth accounting methodology	47
3.3 Output and intermediate inputs	60
3.4 Labour services	63
3.5 Capital services	69
3.6 Issues in measuring outputs, inputs and productivity	78
3.7 Measurement issues in market services	90
3.8 Comparisons with alternative measures	100
3.9 Concluding remarks	106
Appendix The EU KLEMS database: contents of the March 2008 version	107

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

vi	<i>Contents</i>
4	Structural change 129
4.1	Introduction 129
4.2	Trends in output and employment 132
4.3	Trends in productivity 136
4.4	Growing role of skills and ICT capital 140
4.5	Concluding remarks 150
5	The industry origins of aggregate growth 152
5.1	Introduction 152
5.2	Methodology: industry contributions to growth 152
5.3	Labour productivity growth 156
5.4	Capital and labour input growth 161
5.5	Multi-factor productivity growth 172
5.6	Patterns of growth: yeast versus mushrooms 177
5.7	Concluding remarks 183
	Appendix 187
6	Productivity levels and convergence 189
6.1	Introduction 189
6.2	Level accounting methodology 191
6.3	Basic data for productivity level comparisons 201
6.4	Productivity levels: crude versus data-intensive measures 210
6.5	Reliability of level estimates 219
6.6	Productivity gaps and accounts 226
6.7	Convergence analysis 237
6.8	Determinants of productivity growth 241
6.9	Concluding remarks 250
7	Drivers of productivity growth in Europe 252
7.1	Paths for productivity growth in Europe 252
7.2	Measuring services productivity 255
7.3	The role of intangible capital 259
7.4	Demand, productivity and innovation 263
7.5	Resource reallocation, competition and regulation 265
7.6	Concluding remarks 267
	<i>References</i> 268
	<i>Index</i> 289

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)*Figures*

2.1 GDP per hour worked and GDP per capita, total economy, EU-15 as percentage of USA, 1960–2007	<i>page</i> 20
2.2 Productivity and capital intensity levels, market economy, EU-10 as percentage of USA, 1980–2005	22
2.3 Sources of labour productivity growth, market economy, EU countries and USA, 1980–2005	29
2.4 Major sector shares in total hours worked, total economy, EU countries and USA, 1980 and 2005	30
2.5 Major sector contributions to the EU–US gap in labour productivity, market economy, 2005	38
2.6 Major sector contributions to aggregate labour productivity growth, market economy, EU countries and USA, 1980–2005	41
3.1 Growth rates of multi-factor productivity, twenty-six industries, EU, 1980–2005	55
3.2 Growth rates of labour productivity, twenty-six industries, EU, 1980–2005	59
3.3 Growth rates of gross output, twenty-nine industries, EU, 1980–2005	62
3.4 Share of high-skilled workers in total hours worked (percentage), twenty-nine industries, EU, 1995	67
3.5 Growth rates of labour input, twenty-nine industries, EU, 1980–2005	68
3.6 Share of ICT capital compensation in value added (percentage), twenty-nine industries, EU, 1995	77
3.7 Growth rates of capital input, twenty-nine industries, EU, 1980–2005	78
4.1 Ratio of services and goods production, EU and USA, 1980–2005	133
4.2 Value added per hour worked (1980 = 100)	139
4.3 Multi-factor productivity (1980 = 100)	140

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

viii

*List of figures*

4.4 Labour compensation as a percentage of value added	144
4.5 Compensation of high-skilled workers as a percentage of value added	146
4.6 Compensation of ICT capital as a percentage of value added	148
5.1 Labour productivity growth in the EU, 1980–2005	157
5.2 Labour productivity growth in the EU and USA, 1995–2005	158
5.3 Industry contributions to aggregate labour productivity, EU, 1980–2005	160
5.4 Industry contributions to aggregate labour productivity, EU and USA, 1995–2005	161
5.5 Share of ICT and non-ICT capital compensation in value added, market economy, EU and USA, 1980–2005	162
5.6 Contribution to aggregate labour productivity of industry ICT-capital deepening, EU and USA, 1995–2005	165
5.7 Contribution to aggregate labour productivity of industry non-ICT capital deepening, EU, 1980–2005	168
5.8 Contribution to aggregate labour productivity of industry non-ICT capital deepening, EU and USA, 1995–2005	169
5.9 Contribution to aggregate labour productivity of industry changes in labour composition, EU and USA, 1995–2005	171
5.10 Multi-factor productivity growth in the EU, 1980–2005	173
5.11 Multi-factor productivity growth in the EU and USA, 1995–2005	174
5.12 Contribution to aggregate labour productivity of industry MFP growth, EU, 1980–2005	175
5.13 Contribution to aggregate labour productivity of industry MFP growth, EU and USA, 1995–2005	177
5.14 Examples of Harberger diagrams	179
5.15 Harberger diagrams of market economy MFP growth in the EU and USA, 1995–2005	181
5.16 Harberger diagrams of market economy MFP growth in the EU, 1980–95 and 1995–2005	182

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

<i>List of figures</i>	ix
5.17 Harberger diagrams of market economy ICT capital growth in the EU and USA, 1995–2005	184
6.1 Industry contributions to the EU–US gap in labour productivity, market economy, 2005	232
6.2 Standard deviation of multi-factor productivity levels, 1970–2005	239
7.1 Sector contributions to market economy MFP growth scenarios, Europe and USA	254
7.2 Intangibles and labour productivity growth in Europe and the USA, 1995–2003, market economy	261



Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

## Tables

1.1 Growth of GDP, GDP per capita and GDP per hour worked, EU-15 and USA, 1950–2006	<i>page 4</i>
2.1 Decomposition of output growth, market economy, EU and USA, 1980–2005	27
2.2 Major sector contributions to labour productivity growth in the market economy, EU and USA, 1980–2005	32
2.3 Hours worked and productivity growth, major sectors, EU, 1980–2005	33
2.4 Contributions of sectors to labour productivity growth in market services, EU and USA, 1980–2005	35
2.5 Gross value added growth and contributions, market economy, EU countries, 1995–2005	40
2.6 Major sector contributions to labour productivity growth in the market economy, EU countries and USA, 1995–2005	42
3.1 Example of decomposition of gross output growth, metal manufacturing in the UK, 1995–2005	53
3.2 Example of decomposition of value added and labour productivity growth, metal manufacturing in the UK, 1995–2005	57
3.3 Classification of labour force for each industry	64
3.4 Example of labour services growth calculation, metal manufacturing in the UK, 1995–2005	65
3.5 List of asset types and depreciation rates	69
3.6 Example of capital services growth calculation, metal manufacturing in the UK, 1995–2005	75
3.7 Growth accounting for major sectors, EU, 1980–2005	79
3.8 Growth accounting for major sectors, USA, 1980–2005	80

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

<i>List of tables</i>	xi
3.9 Growth in market versus non-market economy, EU and USA, 1995–2005	83
3.10 Share of value added in market services in European countries deflated using A-, B- or C-methods around the year 2000 (percentage)	93
3.11 Average annual growth of real retail sales and margins, 1987–2002	97
3.12 Growth in implicit bank output volumes and in house prices relative to the overall price level, 2000–6	99
3.13 Alternative estimates of MFP growth in market economy, average 1995–2005	102
3A.1 Variables in EU KLEMS database	109
3A.2 Country, period and variable coverage in EU KLEMS database, March 2008	113
3A.3 Industry list for growth accounting variables	115
3A.4 Definitions of high-, medium- and low-skilled	119
3A.5 Sources used for employment and wages by type	122
3A.6 Sources used for capital stock estimation	124
3A.7 Total economy shares and industry characteristics, twenty-six industries, EU, 1980 and 2005	126
4.1 Description of sectors	132
4.2 Gross value added by sector as a percentage of GDP	134
4.3 Hours worked by sector as a percentage of total hours worked	135
4.4 Labour and multi-factor productivity growth, 1980–2005	138
4.5 Compensation of all workers as a percentage of value added	145
4.6 Compensation of high-skilled workers as a percentage of value added	147
4.7 Compensation of ICT capital as a percentage of value added	149
5.1 Industry sources of labour productivity growth, EU and USA	155
5.2 Industry contributions to aggregate labour productivity, EU and USA	159
5.3 Growth of ICT-capital deepening and ICT shares, EU and USA	163

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

xii

*List of tables*

5.4 Contribution of industry ICT-capital deepening, EU and USA	164
5.5 Contribution of industry non-ICT capital deepening, EU and USA	167
5.6 Contribution of change in industry labour composition, EU and USA	170
5.7 Contribution of industry MFP growth, EU and USA	175
5.8 Patterns of market economy MFP growth, 1980–2005	180
5A.1 Growth accounts by industry, EU, 1980–2005	187
6.1 Example of input and output comparison, transport equipment manufacturing, Germany and USA, 1997	198
6.2 Example of level accounting, transport equipment manufacturing, Germany and USA, 1997	200
6.3 Various alternative PPP measures, 1997	212
6.4 Measures of labour input, 1997, market economy	213
6.5 Measures of capital input per hour worked, 1997, market economy	216
6.6 Alternative measures of market economy MFP levels, 1997 (USA = 1)	218
6.7 Relative levels of inputs and productivity in the EU, major sectors, 2005 (USA = 1)	227
6.8 Accounting for the EU–US gap in labour productivity, 2005	228
6.9 Relative levels of inputs and productivity in the EU, twenty-six industries, 2005 (USA = 1)	230
6.10 Relative levels of inputs and productivity, EU countries, market economy, 2005 (USA = 1)	234
6.11 Accounting for the labour productivity gap with the USA, EU countries, market economy, 2005	235
6.12 Technology leaders, major sectors, 2005	237
6.13 Testing for convergence across countries	240
6.14 Relationship between technology gaps, ICT use and productivity growth	244
6.15 Relationship between high-skilled workers and productivity growth at the aggregate and services industry levels	247
6.16 The effect of barriers to entry on productivity growth in services	250

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

## *Preface and acknowledgements*

Economic growth is a key factor in the improvement of our living standards and hence of great interest to academics and policy makers alike. This book aims to explain why growth across Europe has been disappointing since the mid 1990s, both compared to earlier periods and compared to the United States, which showed resurgent growth after 1995. In the process we present the EU KLEMS database, a rich data toolbox that can be used to explore these and other growth-related questions. The main message of this book is that an industry perspective on growth and the sources of growth is essential because of the great diversity in the drivers of growth in agriculture, manufacturing and services industries, including trade, transport, financial, business and personal services.

The empirical study of sources of economic growth has a long tradition in Europe, starting as far back as the seventeenth century when William Petty began to construct measures of economic performance including comparisons of output and productivity in industry, trade and transportation. Over the centuries, with the emergence of standardised national accounts and other internationally comparable statistical sources, the measurement of sources of growth has become more sophisticated. During the second half of the last century, growth accounting evolved as a standard methodology. In 1987, Jorgenson, Gollop and Fraumeni published a pioneering study laying out what has become known as the KLEMS approach. The KLEMS method measures the changes in the quantity and quality of capital (K), labour (L), energy (E), material inputs (M) and service inputs (S) as contributions to output growth. This approach has subsequently been particularly useful in tracing the effects of the development and deployment of information and communication technology (ICT) on the resurgence of the American economy since 1995 (Jorgenson *et al.* 2005).

While the KLEMS methodology has been replicated in studies for some individual countries, a standardised comparison of European

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

countries has not been available until recently. This became increasingly pressing in the early 2000s as European productivity growth seemed to be on a declining trend, in the context of accelerating growth in the United States and increasing competition from emerging economies such as China and India. The slowing growth and faltering emergence of the knowledge economy in Europe led to an ambitious action programme of the European Commission, called the 'Lisbon Agenda', aimed at boosting competitiveness, primarily through innovation. Monitoring and evaluation of progress in achieving these goals required a comprehensive analysis of economic growth in Europe based on a detailed industry-level database. With evidence of the rising importance of ICT and market services for growth, there was also renewed attention given to measurement issues and the international comparability of national statistics. Clearly, there was an increasing need for new methods, comparable statistics and convergence of methods of measuring productivity. The aim of the EU KLEMS initiative set up in 2003 was to meet this demand.

This study is the result of the multi-year, multi-national endeavour involving a large consortium of researchers. It was supported by the European Commission, Research Directorate-General as part of the 6th Framework Programme, Priority 8, Policy Support and Anticipating Scientific and Technological Needs, and is part of the EU KLEMS Project on Growth and Productivity in the European Union. The grant made it possible to form a consortium of eighteen partners, including universities and research institutes across Europe, as well as Japan and the United States. The result of this collaboration is the EU KLEMS Growth and Productivity Accounts database, publicly available at [www.euklems.net](http://www.euklems.net). This database includes measures of output and detailed capital and labour inputs, and derived variables such as labour and multi-factor productivity at the industry level. The measures are developed for twenty-five individual European Union member states, the United States and Japan and cover the period from 1970 onwards. This book combines a documentation of the EU KLEMS methodology and database with a number of analytical studies that have been carried out using the database. It can therefore be used as the primary reference work for the current and future versions of the EU KLEMS database. In particular Chapters 3 and 6 provide a detailed account of the growth accounting and level accounting methodologies used in the EU KLEMS project. The analysis in the book is

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)*Preface and acknowledgements*

xv

primarily focused on the comparative output and productivity performance of the European Union, relative to the United States. In this respect, Chapters 2, 4 and 5 reflect our assessment of the comparative growth performance of the two regions during the period 1980–2005.

The current book is a reflection of the significant work carried out by the EU KLEMS consortium that has led to the creation of the online database, and a series of academic and policy publications on growth and productivity. The data work for the EU KLEMS Growth and Productivity Accounts would not have been possible without the input of all consortium members and the persons belonging to these institutions. Our thanks go to Centre d'études prospectives et d'informations internationales (CEPII), Paris (Michel Fouquin, Laurence Nayman, Anita Wölfl); Centre for Economic and Business Research (CEBR), Copenhagen (Martin Junge, Svend Hougaard Jensen, Mickey Petersen); Netherlands Bureau for Economic Policy Analysis (CPB), The Hague (Henry van der Wiel, Ate Nieuwenhuis, Paul de Jongh); Deutsches Institut für Wirtschaftsforschung e.V. (DIW), Berlin (Bernd Görzig, Martin Gornig, Rainer Vosskamp); Federaal Planbureau (FPB), Brussels (Chantal Kegels, Bernadette Biatour, Jeroen Fiers, Bernard Klaus Michel, Luc Avonds); Istituto di Studi e Analisi Economica (ISAE), Rome (Carlo Milana); Instituto Valenciano De Investigaciones Economicas (IVIE), Valencia (Matilde Mas, Javier Quesada, Ezequiel Uriel, Lorenzo Serrano); Helsingin kauppakorkeakoulu (Helsinki School of Economics) (Matti Pohjola); Austrian Institute of Economic Research (WIFO), Vienna (Michael Peneder, Kurt Kratena, Martin Falk); Vienna Institute for International Economic Studies (WIIW), Vienna (Peter Havlik, Monica Schwarzappel, Robert Stehrer, Sebastian Leitner); Amsterdam Business and Economic Research (AMBER), Free University Amsterdam (Eric Bartelsman, Hans Quene); University of Konstanz (Jörg Beutel); The Conference Board Europe, Brussels (the late Robert McGuckin III, Janet Hao); Harvard University (Dale Jorgenson, Mun Ho, Jon Samuels); Pellervo Economic Research Institute (PTT), Helsinki (Janne Huovari, Jukka Jalava) and individual contributors such as Kyoji Fukao (Hitotsubashi University), Tsutomu Miyagawa (Gakushuin University), Hak K. Pyo (Seoul National University) and Keun Hee Rhee (Korea Productivity Center). We are particularly grateful to our colleagues at the University of Groningen, the National Institute for Economic and Social Research (NIESR) and the University of Birmingham for all their support

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

during various phases of the project. At the University of Groningen our thanks go to Gerard Ypma, Ton van Moergastel and Edwin Stuivenwold for their excellent work in getting the first EU KLEMS database off the ground, and to Jop Woltjer for his seamless continuation of this work. Lourens Broersma, Carolina Castaldi, Erik Dietzenbacher, Abdul Azeez Erumbam, Reitze Gouma and Bart Los provided additional help and advice. We are also grateful to Rob Willems for administrative support to the project. At NIESR, our thanks go to Mari Kangasniemi, Peter Loveridge, Ana Rincon and Catherine Robinson; and at the University of Birmingham to Yasheng Maimaiti, Fei Peng and Nicholas Zubanov.

An important element in the success of the EU KLEMS project has been the co-operation with national statistical institutes across the European Union. The growth accounting system will hopefully be implemented by national statistical institutes and Eurostat as part of their regular statistical systems. While we received very useful advice from all statistical institutes across Europe, we have particularly received significant in-kind help from Statistics Netherlands (Mark de Haan, Dirk van den Bergen, Bert Balk, Hans Kolfoort), Statistics Finland (Pirkko Aulin Ahmavaara and Antti Pasanen), the Office of National Statistics, UK (Anna Soo and Tuu Van Nguyen), ISTAT, Italy (Cecilia Joan-Lasinio, Massimiliano Iommi, Antonella Baldassarini), Statistics Luxembourg (John Haas) and Statistics Sweden (Hans-Olof Hagén and Tomas Skyttesvall). Researchers from the OECD played an important role, both as external observers and advisors; we would like to thank in particular Colin Webb, Dirk Pilat, Paul Schreyer and Nadim Ahmad. We are also grateful to Eurostat, especially to Arturo de la Fuente, Frank Schönborn, Leonidas Akritidis and Jukka Jalava for their support in arranging regular meetings with the National Accounts Working Party as well as setting up the statistical module of the EU KLEMS database at the Eurostat website. We received strong support from the European Commission Services throughout the project and are especially grateful to DG Research (Ian Perry, Marianne Paasi) and DG ECFIN (Werner Roeger, Kieran McMorrow, Douglas Koszerek) for their help and advice. Finally, the project also owes much to a number of individuals for advice and support at various stages of the project, including Eric Bartelsman, Erwin Diewert, Mun Ho, Mathilde Mas, Nicholas Oulton and Jack Triplett.

Cambridge University Press

978-0-521-19887-5 - Economic Growth in Europe: A Comparative Industry Perspective

Marcel P. Timmer, Robert Inklaar, Mary O'Mahony and Bart van Ark

Frontmatter

[More information](#)

---

*Preface and acknowledgements*

xvii

We owe special thanks to Dale Jorgenson from Harvard University, one of the pioneers of the growth accounting method. His unwavering support for the project from the embryonic initialisation phase to completion has been highly motivating and a continuous source of inspiration for the project participants. We are looking forward to continuing our collaboration and extending this type of work to other countries in the world.

Finally, we also would like to thank Rebecca Cooke and Chris Doubleday for excellent work on the final edit of this manuscript.

All viewpoints expressed in this book are those of the authors only, and any remaining errors are our responsibility.