Productivity Growth in the Manufacturing Sector

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Productivity Growth in the Manufacturing Sector: Mitigating Global Recession

EDITED BY

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Vidyasagar University, West Bengal, India

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Table of Contents

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List of Figures

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List of Tables

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Foreword

As a consequence of the Covid-19 emergency and the lockdown, the manufacturing industry suffered problems such as a drop in turnover, liquidity shortages, and interruption of production chains. The industry is, thus, struggling with a crisis that has few precedents in history. The global economy led by the highly developed countries has been facing a recession in output and employment growth which has been causing a decrease in the world demand. The effects of this crisis are multiple, as well as the attempts to respond to it, which depended not only on the resilience of the companies but also on the measures put in place by the various national governments.

The manufacturing sector provides approximately 16% of the global gross domestic product (GDP), and it employs 14% of the workforce. This sector's relative size in an economy varies with its stage of development. When economies industrialize, employment and output in manufacturing both rise rapidly, but once this sector's share of the GDP peaks at 20 to 35%, it falls in an inverted U pattern, along with its share of employment. The reason for this is that, as wages rise, consumers have more money to spend on services, and the latter's growth accelerates. It follows that the growth of the manufacturing sector is essential to accelerate the growth of the service sector.

Despite the deindustrialization and the differences between the most important Western economies, their manufacturing sector plays a key role in the evaluation of the economic cycle. In particular, all these economies show a close link between the expansionary and negative phases of GDP and the production cycles. Therefore, the manufacturing sector remains a significant factor of oscillation. Furthermore, this correlation increases during recessions, showing that the production cycle is a powerful transmission channel in difficult times. The leading indicators of the industry offer timely and quality information on the state of an economic cycle. Therefore, the modest recovery observed following the global financial crisis can be partially explained by the weak recovery in the manufacturing sector, which resulted in a lack of investment.

A new global consuming class has been emerging in recent times, and most of the consumption is taking place in developing economies. This will create rich new market opportunities. It is, thus, essential for companies to develop a highly detailed understanding of the specific emerging markets, as well as the needs of their existing customers.

The manufacturing sector may flourish by increasing its productivity. Productivity growth is essential not only to increase output but also to improve the

competitiveness of an industry both in the domestic and international markets. Two distinct sources govern the growth of an economy, so that growth can be input-driven and productivity-driven. Input-driven growth is achieved through the increase in factors of production, which is inevitably subjected to diminishing returns and is not sustainable in the long term. Productivity-driven growth is due to a growth in output that cannot be explained by the growth in total inputs. It is normally credited to the improvement in knowledge, organizational structure, human resources management, skills attainment, information technology, and efficient use of factors of production.

A very delicate open issue concerns the question of the origin of the different performances of companies. The ability of production systems to react to changes and to new technologies depends on it. And on it depends the keeping and relaunching of the productive system and, consequently, the social fabric which forms its basis and which receives the benefits of employment and income.

Against this background, the present book focuses on the empirical verifications of the productivity and efficiency of the manufacturing sector of the world economy, with special emphasis upon the emerging economies during the pre- and postglobal financial crisis.

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It is a matter of great pleasure for me to complete the proposed book titled, *Productivity Growth in the Manufacturing Sector: Mitigating Global Recession*, after giving over a long time on the stages from proposal writing to final submission. I have run into large debts to a number of persons in the course of this huge task. It would be blameworthy if I do not recognize the contributions of the concerned academicians and the other members of the society directly or indirectly attached to the project.

At first, I must acknowledge the Emerald Publishing Ltd. Team for approving the proposal and continuously guiding me at all stages of developments of the book. Secondly, I should be grateful to my colleague Dr Ramesh Chandra Das, Associate Professor of Economics, Vidyasagar University, India, who left no stone unturned in his constant help and support at every stage of this volume, and my PhD supervisor Dr Madhusudan Datta, Professor of Economics, Kalyani University, India, from whom I got the basic conceptual ideas in respect of this field of research. Thirdly, I am grateful to Dr Purnendu Sekhar Das, Professor (Retd.) of Economics, Vidyasagar University and VGSOM, IIT, Kharagpur, India, with whom I discussed various issues connected with this project and got valuable suggestions. Fourthly, I must express gratitude to Professor Enrico **Ivaldi, University of Genova, Italy, and Centro de Investigacionesen Econometría – CIE, University of Buenos Aires, who took lot of pains in writing the foreword of this book inspite of his busy** schedule, Dr Hasan Dinçer, Professor of Finance at Istanbul Medipol University, Faculty of Economics and Administrative Sciences, Istanbul-Turkey, Professor Begum Sertyesilisik, Izmir Democracy University, Turkey, Dr Pulak Mishra, Professor, Department of Humanities and Social Sciences, IIT Kharagpur, India, Dr Arpita Ghose, Professor of Economics, Jadavpur University, India, and all my colleagues in the Department of Economics, Vidyasagar University, India, for their constant help and support. Fifthly, I am highly indebted to my Doctoral Research Scholar Md Rakibul Hasan, who was constantly by my side during the whole project and helped me to go through the rough terrain of this work. Fifthly, I should pay gratitude to all the contributing authors for their valuable chapter contributions and showing their patience for such a long length project. I must acknowledge the values they added to the existing literature through this volume.

Last but not the least, I must be grateful to my parents, wife and son, brothers, and other members of the family for their continuous influence, supports, and sacrifice in carrying out the extensive project. Of course, no one other than me, as the editor, discloses to remain entirely responsible for any errors still stay behind the book.

Mihir Kumar Pal
Editor

Introduction

The global economy headed by the highly developed and partly upcoming developing nations has been facing prolonged downturn in its output and employment growth which has been pulling down the magnitudes of world demand and thereby provoking the economies into disgruntlement trade and political relations. The recent US–China trade retaliation is one of such jeopardized situations in world trade. Not only the impact of this retaliation is confined to these two economies, its ramifications are worldwide. Overemphasizing upon service-led growth, the manufacturing sectors have been given less importance, although, nurturing the sector in proper channel might be helpful in strengthening the base of the economies. Focusing on increasing the productivity and efficiency of this sector may lead to absorbing economic shocks that the so-called developed economies have been witnessing so far.

The feeling that a substantial part of output growth in the rapidly growing economies is attributable to technological progress has given rise to intensive research on the analysis of productivity growth over the last four decades. These studies have proposed and chiseled toward perfection of new concepts and have opened up an entirely new area of research.

Productivity growth is essential to increase output as well as to improve the competitiveness of any industry for both domestic and international markets. In economic theory, technological progress and total factor productivity (TFP) are often used synonymously, though there is a conceptual distinction between them. Technological progress is the advances in knowledge and its application to the art of production (invention, innovation, and diffusion), and on the other hand, TFP is defined as the ratio of output to a weighted combination of inputs. The latter is a boarder concept which includes technological progress, change of technical efficiency, and change of scale. Technical efficiency includes inputs productivity, capacity utilization etc. TFP can be improved through smart technologies, smart workforce, and innovations. Productivity-driven development can be enabled by the enhanced TFP covering technological progress, technological efficiency, and change of scale.

Economies need to be resilient as countries having resilient economy that can enhance welfare of their people and achieve sustainable development. Resilience of the economy is related to its ability to cope with the challenges (e.g. economic shocks and environmental crises). It requires holistic and systematic, as well as strategic approach as it is directly related with the sustainable development of the countries. Enhancing resilience of each country's economy can enhance resilience

of the global economy as countries economic status can influence each other. In other words, there is a need for resilient global economy. Manufacturing industries is one of the pillars of the production, sustainable development, and global economy. Intellectual capital is also regarded as one of the significant determinants of efficiency, profitability, and ultimately value of a manufacturing firm. Exploration of the changing dynamics in the relationship between intellectual capital and firm-level efficiency in the face of global economic crisis is becoming a special matter of interest. During postglobalization period, tariff imposition on manufacturing trade has a significant effect on their economy of developed and developing nations. Along with the volume and balance of trade, both export and import has separately observed a significant change under tariff regime and made contrasts between the developing and developed countries.

The next era of global growth and innovation may be considered as the era of manufacturing sector. It is also observed that globally, manufacturing sector significantly continues to grow. Manufacturing sector serves as one of the major shares in global economy. Its relative size varies with the stage of development of the economy. Employment and output increase rapidly in well-industrialized economy which can further accelerate the growth of the service sector as consumers have more money to spend on services.

Under the milieu, the present book has covered different issues related to the productivity growth of manufacturing sector and its implications to mitigate recessionary situations in the economies. It has been structured into two sections. Section I covers the discussion on the related aspects of manufacturing sector for the global level, and Section II covers the same issue on Indian perspectives. Section I contains 9 chapters, and Section II contains 10 chapters. The brief outlines of all the chapters are presented below.

Section I: Manufacturing Productivity at the Global Perspectives

Chapter 1 aims to explore econometrically, whether productivity growth across countries can be a remedial measure toward mitigating global recession considering six economies like Korea Republic, Japan, India, China, US, UK as well as world economy as a whole during the period 1990–2018. The empirical findings disclosed that the impacts on the growth of economies from the growth rates of the manufacturing sector, productivity, and labor quantity are positive and statistically significant, while the effects of growth of the capital deepening and labor composition on economic growth of those sampled countries are statistically significant but negative. Some key factors are facilitating global learning spillovers; allowing productive firms to thrive; and making the most of human capital that should be taken care of.

Chapter 2 makes an analysis to the relationship between Labor Productivity, Manufacturing Output, and Growth of GDP, for 25 major economies across the globe, covering the period 2000–2015. Findings suggest that in most of the nations these variables have significant impact on one another, but there are exceptions as well. Apart from that, there are variables like Energy Consumption, Health

Status, Life Expectancy, foreign direct investment (FDI), etc. which are significant in influencing these variables.

Chapter 3 accounts for both export and import separately in order to observe their dynamisms under tariff regime and make comparisons between the developing and developed countries using the World Development Indicators and World Integrated Trade Solution databases of World Bank (2020) on China (developing nation) and the United States (developed nation) during 1970–2019. Cointegration tests and vector error correction models indicate that the relationship between tariff and manufacturing trade is positive and statistically significant.

Chapter 4 aims to determine the relationship between labor productivity and economic development of Turkey over the period 1970 to 2017. Results show that there is a causal relationship from labor productivity to economic growth in Turkey, and it can be said that labor productivity should rise in order to increase economic development and suggest measures to thereof.

Chapter 5 analyzes the contribution of allied sectors over GDP considering manufacturing as a separate entity under the regional variation and different income classification using World Bank data set of 2010 and 2018 for cross-sectional analysis of GDP growth incorporating regional variation and income classification as discrete variables. Region specific and income classification specific regression identifies the variations in scores and changes in importance of different allied sectors.

Chapter 6 develops a model to examine ways for enhancing resilience of the global economy through smart, circular, and competitive manufacturing industry. TFP can be improved through smart technologies, smart workforce and innovations, which requires holistic, systemic as well as strategic approach as it is directly related with sustainable development of the economy.

Chapter 7 conducts segmentwise analysis of commodities (based on processing) in relation to international trade by building a theoretical model considering three types of goods segments and international trade dynamics for the United States and China. Results show that, in segment of raw goods, cost can boost the international trade whereas, in finished goods segment, variety helps.

Chapter 8 tries to explore, whether manufacturing sector productivity growth was one of the reasons that the crisis worsened in India or was it because of the crisis that India's manufacturing sector went into a deep recession, considering Centre for Monitoring Indian Economy (CMIE) Prowess database, during the period July 2007 to July 2010. It is based on the causality results that it was because of the subprime crisis that India's manufacturing sector went into a deep recession.

Chapter 9 empirically investigates the ramifications of the intellectual capital on the level of efficiency of the firm. It also explores the changing dynamics in the relationship between intellectual capital and firm-level efficiency in the face of global economic crisis during 1999–2000 to 2013–2014. Empirical results reveal that intellectual capital significantly determines the efficiency of the manufacturing firms. However, the impact of financial crisis is not robust in changing the synergy

between efficiency and intellectual capital. Along with its size, age and leverage were found to be significant determinants of efficiency of manufacturing firms.

Section II: Manufacturing Productivity at Indian Perspectives

Chapter 10 examines whether increase in wages, salaries, and other benefits can necessarily motivate the workforce at workplace and enhance their productivity and efficiency. Long-term trends show that while the share of wages, salaries, and also that of total emoluments have increased in recent years; such changes are not reflected in higher productivity.

It suggested that, in addition to incentives in the form of higher wages, salaries, and other benefits, enhancing efficiency and productivity of human resources requires adequate emphasis on human aspects as well, through proper human resource management policies.

Chapter 11 tries to examine the sources of total factor productivity growth (TFPG) of the 2-digit manufacturing industries as well as total manufacturing industry of Gujarat during 1981–1982 to 2010–2011. The empirical finding clearly reveals that although factor accumulations as well as resource allocations in most of the 2-digit manufacturing industries of the state have improved during the postreform period, technological progress and technical efficiency change of the same have deteriorated in most of the industries of the state, which requires government intervention.

Chapter 12 attempts to estimate the output growth and TFPG in Indian Manufacturing Industry over the period 1987–1988 to 2016–2017 and also aims to find a possible way out of mitigating global recession by establishing a link between TFPG and indicators of economic growth. On an average, TFPG of Indian Manufacturing Industry is negative, and it has a declining trend. This study considers India's exports of manufacturing products to 27 destination countries.

Chapter 13 analyzes the growth and productivity of unorganized manufacturing enterprises (UMEs) on the basis of the latest two rounds of National Sample Survey Office (NSSO) unit level data incorporating all states and union territories (UTs) of India. It reveals that the growth of UMEs, employment, gross value added (GVA), and fixed assets widely varied across states/UTs, and these growth rates were substantially high in a number of states during 2010–2011 and 2015–2016. The government has to make deliberate attempts to increase the growth of UMEs on one side and raise productivities of UMEs through skill developments on the other side.

Chapter 14 attempts to measure TFPG of Indian textile firms during 1995–202016. It also examines the impact of withdrawal of multifiber trade agreement (MFA) since 2005. TFPG has increased in 1999–2000, 2000–2001, 2009–2010, and 2012–2013. After dismantling of MFA, Malmquist productivity index (MPI) level has significantly declined, with an increase in its growth rate; but the increase is not statistically significant. The study also clearly indicates that marginal effect of exports, imports, and advertisement expenditures are positive;

increase in these variables promotes TFPG. The greater role of advertisement expenditures over marketing expenditures is also evident.

Chapter 15, using cluster sampling method of collecting data from 166 manufacturing firms in India and taking help of five-point Likert scales, tries to analyze the potentiality of different manufacturing industries in eastern India. It is found that liberalized FDI policy, focus on export, focus on increasing rural consumption, delicensing of industries, and financial sector liberalization significantly influence manufacturing productivity and hence sustainable economic development.

Chapter 16 aims to investigate the changing growth pattern of India's ready-made garment export and also the impacts of trade openness based on secondary data complied from various issues of "Handbook of Statistics on Indian Economy" for the period 1987–1988 to 2018–2019. Results show a declining growth rate, and the industry may benefit from trade openness.

Chapter 17 tries to investigate the behavior of relative wage rate, TFPG, and also attempts to explore the causal relationship between relative wage rate and productivity of labor as well as relative wage rate and TFPG in food and beverage industry in India over the period 1980–1981 to 2017–2018. A significant break, during 1984–1985 is found for relative wage rate and labor productivity, but it is 2007–2008 for TFPG. For the three variables, growth rate has increased after the break.

Chapter 18 attempts to find the role and prospects of Food Processing Industry (FPI) in Indian economy and also tries to highlight the present and future role of the same. Results disclose that this industry helps to earn foreign currency by exporting processed food products and attracts FDI. So, in the context of present global recession, this industry is the lifeline to the Government of India to combat the recessionary scenario.

Chapter 19 tries to examine the impact of car selling across the states in India due to the variation in income, tax levied on petrol and diesel for the period 2018–2019. It has been found that, higher income of a state has a positive impact whereas higher tax on petrol and diesel which varies across the states has a negative impact on car selling. Again, it also examine whether there exists any neighborhood impact on growth rate of car selling of different tax rate on petrol and diesel on the basis of Moran's Index. It is witnessed that there exist a high level of spatial autocorrelation among the different states in case of growth of a car selling, tax imposition on diesel as well as on petrol.

The essence of the chapters covered by the book reveal that emerging economies as well as developed ones has been facing several recessionary scenario during the recent decades. Substantial increase in TFPG of the manufacturing industries may be one of the possible ways out in mitigating global recession. Total factor productivity can be improved through smart technologies, smart workforce, and innovations. It requires holistic and systematic as well as strategic approach as it is directly related with the sustainable development of the countries and welfare of their people. Resilient economy can enhance welfare of their

people and achieve sustainable development. The next era of global growth and innovation may be considered as the era of manufacturing sector. The policy suggestions provided by the authors in the book will inexorably help to strengthen the manufacturing industry to combat any recessionary shock.

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