Structural Change and Economic Dynamics 34 (2015) 46–59

Contents lists available at ScienceDirect

Structural Change and Economic Dynamics

journal homepage: www.elsevier.com/locate/sced

Manufacturing and economic growth in developing countries, 1950–2005

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ARTICLE INFO

Article history:
Received October 2013
Received in revised form June 2015
Accepted June 2015
Available online 8 July 2015

Keywords:
Economic growth
Development
Industrialisation
Manufacturing sector

JEL classification:
O10
O14
O40

ABSTRACT

Historically, manufacturing has functioned as the main engine of economic growth and development. However, recent research raises questions concerning the continued importance of the manufacturing sector for economic development. We re-examine the role of manufacturing as a driver of growth in developed and developing countries in the period 1950–2005. We find a moderate positive impact of manufacturing on growth. We also find interesting interaction effects of manufacturing with education and income gaps. In a comparison of the subperiods, it seems that since 1990, manufacturing is becoming a more difficult route to growth than before.

1. Introduction

This paper addresses the question of the importance of manufacturing for economic development. In the older literature, there was a near-consensus that manufacturing was the high road to development. Success in economic development was seen as synonymous with industrialisation. This consensus now seems to be unravelling. In advanced countries, service sectors account for over two thirds of GDP. This alone gives the service sector a heavy weight in economic growth in the advanced economies. In developing countries the share of services is also substantial. It is now argued that services sectors such as software, business processing, finance or tourism may act as leading sectors in development and that the role of manufacturing is declining. The prime exemplar for this perspective is India since the 1990s (Dasgupta and Singh, 2005). Other authors argue that it is not manufacturing as a whole that is important, but subsectors of manufacturing such as Information and Communications Technology (Fagerberg and Verspagen, 1999; Jorgenson et al., 2005).

On the other hand, the East Asian experience documents the key role that industrialisation has played in the economic development of developing countries in the past fifty years[1]. Further, all historical examples of success

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http://dx.doi.org/10.1016/j.strueco.2015.06.002
0954-349X/

[1] When we speak about industrialisation in this paper we explicitly focus on the role of manufacturing. In the ISIC classifications the industrial sector also includes mining, utilities and construction. Many papers on

in economic development and catch-up since 1870 have been associated with successful industrialisation (Szirmai, 2012).

This paper sets out to investigate the role of manufacturing in economic growth and development by testing econometrically whether manufacturing has led to economic growth in a large panel of countries during the post-war period. The proposition to be tested is that manufacturing had a significant positive effect on growth (in developing countries), and that this effect of manufacturing was stronger than that of other sectors, in particular the services sector. This is referred to as the engine of growth hypothesis. We employ a regression framework using a dataset of 88 countries, including 21 advanced economies and 67 developing countries, covering the period 1950–2005. Among other things, we investigate whether the role of manufacturing in growth has changed over time, thus addressing the above mentioned question about whether the role of manufacturing has recently been waning in favour of services. The novelty of the paper lies in applying state of the art panel data regression methods to a new large dataset with data on manufacturing shares going back to the 1950s. This provides new insights in the context of the ongoing debate about the importance of industrialisation.

The paper is structured as follows. The theoretical arguments for the Engine of Growth hypothesis are summarised in Section 2. Section 3 reviews some of the recent contributions in the literature. Section 4 details our precise research questions. Data and methods are discussed in Section 5. The empirical results are presented in Section 6. Section 7 concludes.

2. The engine of growth argument

The arguments for the engine of growth hypothesis are a mix of empirical and theoretical observations (for more detail, see Szirmai, 2012). There is an *empirical correlation* between the degree of industrialisation and the level of per capita income in developing countries (Kaldor, 1966, 1967; Rodrik, 2009). The developing countries which now have higher per capita incomes have seen the share of manufacturing in GDP and employment increase and have experienced dynamic growth of manufacturing output and manufactured exports. The poorest countries are invariably countries that have failed to industrialise and that still have very large shares of agriculture in GDP. In cross section analyses, the relationship between per capita GDP and share of industry or manufacturing is curvilinear rather than linear, with low levels of per capita GDP associated with low shares of manufacturing, intermediate levels with high shares and high income economies with lower shares (an inverted *U* shape, for example Rowthorn and Coutts, 2004; Rodrik, 2009). For developing countries this implies a positive relationship between GDP per capita and shares of manufacturing. The engine of growth hypothesis assumes that the correlation between levels of GDP per capita and shares of manufacturing results from characteristics of the manufacturing sector that make a special contribution to economic growth (Kaldor's first growth law, see Kaldor, 1966, 1967; Pacheco-López and Thirlwall, 2013). The arguments for a special role of industrialisation in the process of economic growth include the following.

First, it is argued that productivity is higher in the manufacturing sector than in the agricultural sector (Fei and Ranis, 1964; Syrquin, 1984, 1988). Manufacturing is also assumed to have more potential for productivity growth than other sectors. The transfer of resources from low productivity sectors such as traditional agriculture or informal services to high productivity and dynamic sectors such as manufacturing (i.e., industrialisation) provides a *structural change bonus*. This is a temporary effect on the growth rate, i.e., it lasts as long as the share of manufacturing is rising. Similarly, the transfer of resources from manufacturing to services may provide a *structural change burden* if many service activities indeed have little potential for productivity increase (Baumol, 1967). According to Baumol's law, aggregate per capita growth will tend to slow down as the share of services in GDP increases. Baumol's law has been contested in the more recent literature (Riddle, 1986; Timmer and de Vries, 2009; Marks, 2009; Inklaar et al., 2008; Triplett and Bosworth, 2006) but has definitely been part of the engine of growth argument in the past (Rostow, 1960; Gerschenkron, 1962; Kitching, 1982; Higgins and Higgins, 1979). Sectors such as transport, distribution and ICT services and other market services do have potential for productivity growth. But many service sectors such as personal services, health care services and government services are productivity resistant.

Next, compared to agriculture, the manufacturing sector is assumed to offer special *opportunities for capital accumulation*. Capital accumulation can be more easily realised in spatially concentrated manufacturing than in spatially dispersed agriculture and returns to capital (in terms of labour productivity or total factor productivity) are higher than in other sectors. Productive investment opportunities in manufacturing encourage the high savings rates that are characteristic of East Asian development Also investment spending is skewed towards manufactured goods such as machinery, equipment and building materials (Rowthorn and Coutts, 2004). These are among the reasons why the emergence of manufacturing has been so important in growth and development. Capital intensity is high not only in manufacturing but also in mining, utilities, construction and transport. It is much lower in agriculture and services. Capital accumulation is one of the aggregate sources of growth. Thus, an increasing share of manufacturing will contribute to aggregate growth. The engine of growth hypothesis implicitly argues that capital intensity in manufacturing is higher than in other sectors of the economy. Szirmai (2012) has shown that this is indeed the case for developing countries, but not in many advanced economies.

In the third place, the manufacturing sector offers special opportunities for *economies of scale*, which are less available in agriculture or services (Kaldor, 1966, 1967), and for both *embodied and disembodied technological progress* (Cornwall, 1977). The latter argument is of

industrialisation fail to make a clear distinction between industry and manufacturing (for example Rodrik, 2009).