Structural modernisation and development traps. An empirical approach

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A B S T R A C T

This paper explores the relationship between trajectories of structural modernisation and the ability of countries to escape poverty and middle-income traps. The analysis is based on a newly created index of structural modernisation. For each country, the index calculates the productivity gap with respect to the world frontier in activities that typically represent the modern sector of the economy, and weights this relative productivity by the employment share of those activities in the total labour force. The index is calculated for 114 countries from 1960 to 2014. A country is defined as trapped if it takes longer than a benchmark period to move from one income category to another. The analysis shows that expansion of the size of the modern sector without a process of absorption of technology for reducing the technology gap is not enough to ensure steady growth. Inversely, reducing the technology gap in just few sectors will produce an enclave economy that is doomed to stagnate.

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1. Introduction

Why do some countries progressively move closer to the living standards of the richest countries, while others get stuck at low or intermediate phases of development? This paper takes the perspective that divergence in economic performance ultimately reflects the ability of the economic system to realise two key transformations: *structural change* and *technological catch-up*. The success or failure of economic development should be analysed by looking simultaneously at the evolution of both dimensions over time.

Such an analysis, however, poses an empirical challenge: how to grasp these complex dimensions in a simple fashion. The main goal of this paper is to address this empirical challenge. To do so, it proposes a novel index that captures the salient features of these transformations by looking at two variables for which long-term cross-country data are available: the share of labour force employed in modern sectors (structural dimension) and the labour productivity in the modern sectors relative to labour productivity at the international frontier (technological dimension). The new index combines both variables into a single measure of structural modernisation. The index builds on the classical literature on

two-sector models *à la* Lewis (1954), based on sectoral shares in labour and the differentials in labour productivity in the traditional and modern sectors. The crucial difference is that productivity is now defined in relative terms with respect to the world's technological frontier.

The proposed index provides a useful device to characterise the structural trajectories followed by different countries in the process of development. Moreover, it gives interesting insights on the reasons why some countries fail to achieve sustained development in the long run. Countries that fall into poverty traps or middle-income traps are countries that have been unable to sustain their structural transformation along the dimensions that define the structural modernisation index.

The analysis is carried out using a newly constructed dataset that, combining information from various sources, provides unbalanced data for 114 countries over the period 1960–2014 on employment, labour force and value added in broad sectors of the economy, with value added converted into a common currency using industry-specific converters. The paper is structured as follows. Section 2 provides the theoretical and methodological underpinnings of the proposed index together with some preliminary empirical evidence showing salient features of the index and its components. Section 3 describes our approach to distinguishing success and failure in economic development. It also analyses the results of our index in those countries identified as being caught in a development trap, in further detail. Section 4 illustrates how

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the index can be used to study the process of economic development by looking at the trajectories of a selected number of countries throughout the last five decades. Section 5 concludes. Five methodological appendices with details regarding the construction of the dataset and other technicalities are available in an online Appendix.

2. A new index for economic development

This paper develops a new index to characterise trajectories of economic development. This index combines the dimensions of structural change and technological catch up in a single measure. The index will be referred to as the structural modernisation index.

2.1. Structural change

From early contributions in the literature on economic development (Chenery & Taylor, 1968; Chenery, 1960; Kuznets, 1966, 1973) to more recent studies on the sources of economic growth and catch up (Hausmann, Hwang, & Rodrik, 2007; McMillan, Rodrik, & Verduzco-Gallo, 2014; Temple & Wößmann, 2006), a long tradition in economic thought links economic development with the process of transformation and upgrading of productive structures. That is, the progressive shift of the economy from the production of simple goods, typically labour- or natural resource-intensive, to complex and more sophisticated goods, typically capital- and technology-intensive.

Early development economists have approached this issue by postulating a dualistic structure in the economies of the developing world. In the dualistic perspective, modern economic activities, with high productivity using state-of-the-art technologies, coexist with a set of activities with very low productivity, typically of an informal nature and in many cases oriented towards subsistence. The classical models of dual economies à la Lewis and more recent formulations rooted in the Latin American Structuralist tradition have formally illustrated this point, stressing a fact that lies at the core of development: at early stages the key to reduce the gap with the advanced world lies in the reallocation of labour from the traditional to the modern part of the economy.[1]

The importance of structural change for economic development has also been emphasised in other strands of economic thought. Post-Keynesian authors, mainly working in the Kaldorian tradition, have argued that certain sectors (most prominently, manufacturing industries) are better suited to drive economic development. These sectors would provide special opportunities for technological progress and for the exploitation of static and dynamic economies of scale, and would therefore be more prone to generate rapid growth.[2] The pre-eminence of manufacturing, however, has been recently challenged in view of the rise of the so-called *service economy* and information and communication technologies. The successful development of services in India and some other countries has resulted in the proposition that other developmental paths, not exclusively driven by manufacturing, are also possible. Services such as telecommunication, financial services, software development, logistics and transport also have considerable technological dynamism and thus are also regarded as potential engines of economic growth.[3]

The importance of economic structure and structural change lies also at the core of the Evolutionary and Schumpeterian traditions of economic thought.[4] In these cases, however, the emphasis has not been on a single sector as the major driver of economic growth, but rather on the role of technological change, regardless of where it takes place. Although certain activities within manufacturing have typically been singled out as the major drivers of technological change, the list of potential drivers is not restricted and includes a wide array of activities, ranging from high-tech agriculture to modern services.[5] From these perspectives, the absorption of increasingly modern technologies and the corresponding change in industrial structure is a critical component of the development process. The assimilation and mastering of new technologies through a learning process would allow the modern sector to gradually increase its share of output, capital and labour, expanding its relative size and yielding growing levels of national productivity (Nelson and Pack, 1999).

These perspectives provide a foundation for the notion that success in economic development is tied to the expansion of the modern dynamic part of the economy. The index of modernisation proposed here aims at capturing this important insight by looking at the proportion of the labour force participating in modern economic activities. The main empirical challenge lies in how to determine which activities should be included in the modern sector of the economy. Difficulties are compounded by the lack of long time series with highly disaggregated sectoral data for developing countries. The data that are available only allow for a breakdown into nine major sectors as detailed in Table 1.

Ideally each sector of the economy should be divided into its modern and traditional components. Take the case, for example, of agriculture. While small-scale subsistence agriculture should be included in the traditional sector, highly mechanised and technologically advanced agricultural activities oriented towards exports are better characterised as part of the modern economy. By the same token, extremely profitable retailers (such as IKEA or Wal-Mart) should be considered part of the modern sector as opposed to informal street vendors (both included in the same sectoral aggregate). The data requirements allowing for such subtle distinctions, however, would limit the analysis to a few advanced economies. As a second-best solution, our approach identifies those sectors that are predominantly composed of what can typically be considered as modern activities. Following the previous discussion, the salient candidates are: Industry (that is, Mining, Manufacturing, Utilities and Construction) and internationally tradable services (that is, Transport and Telecommunications and Financial and Professional Services[6]). These sectors typically have higher levels of productivity than the rest of the economy and also present a higher potential for technological upgrading and productivity gains. Henceforth, these activities will be grouped together under the heading "modern sector". The remaining activities are categorised as the "non-modern sector".[7] Our key variable to analyse structural change will be, therefore, the share of the total labour force employed in the modern sector and will be denoted with the Greek letter *Lambda*. That is:

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[1] The classical references for dual economies are Boeke (1930), Lewis (1954), Ranis and Fei (1961), and Sen (1966). For contributions rooted in the Structuralist tradition see Botta (2009), Cimoli and Porcile (2013) and Rada (2007).

[2] See Haraguchi et al. (2017), Rodrik (2013) and Szirmai (2012) for recent reviews on the arguments and the empirical evidence supporting the idea that manufacturing industries constitutes one of the major engines of growth of the economy.

[3] See, for example, Eichengreen and Gupta (2011), Maroto-Sánchez and Cuadrado-Roura (2009) and Spithoven (2000).

[4] See Fagerberg et al. (2010) for a recent review of this literature.

[5] A good example in these lines can be found in Pérez (2010) and her proposal for a catching-up strategy in Latin America based on the exploitation of natural resources.

[6] Professional Services are one component of sector K in the ISIC. This component is calculated by subtracting industry number 70 (Real Estate) from this sector.

[7] Note that the non-modern sector is broader than the "traditional" sector in classic dual economy models. It also includes productivity resistant sectors such as government services or restaurants. These sectors are included in the non-modern sector because they have less potential to drive aggregate growth through their productivity dynamics.