

Disentangling services in developing regions: A test of Kaldor's first and second laws

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ABSTRACT

The paper analyses the contribution of services vis-à-vis manufacturing as a driving force of economic growth in developing regions. In doing so, we test Kaldor's first and second growth laws for different service categories, providing a comparative view across Asia, Latin America, and Africa. The work focuses attention on the importance of sector-level disaggregation in exploring the relationship between productivity and economic growth. Hence, it accounts for services sector heterogeneity to help to disentangle those specific branches that may fuel economic growth in the different regions. Panel data estimations are performed for a sample of 32 countries during 1970–2010. Our findings support the key role of manufacturing for growth. However, they also emphasise how market services (particularly, business service activities) may also enhance productivity and output growth 'à la Kaldor'. The research supports recent claims for modernising industrial policy in a way that promotes but is not limited to manufacturing.

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1. Introduction

After the path-breaking works by Clark (1957), Kaldor (1967, 1966), Kuznets (1966), and Chenery et al. (1986), research on structural change and economic development seemed to have reached a stagnant point. However, interest in the dynamics of productive structures and its impact on economic growth has been renewed. The structure of an economy remains important for growth as the capabilities to encourage productivity gains, promote the expansion of other sectors or benefit from internal and external demand growth (Thirlwall, 2013; Cimoli et al., 2005) differ across economic sectors. Moreover, the structural transformation of countries may enhance or reduce economic growth depending on the productivity growth (and levels) of the sectors where resources are reallocated (MacMillan et al., 2014; MacMillan and Rodrik, 2011).

In this regard, Kaldor (1966, 1967) uncovered a set of long-run relationships (commonly known as Kaldor's Growth Laws, KGL) between output, employment and productivity growth at the sec-

toral level using cross-sectional data for 12 OECD countries from 1953 to 1964. The results confirmed the close linkage between the expansion of the industrial activity (manufacturing in particular) and overall output growth as a result of two main mechanisms. First, the presence of increasing returns to scale at the sector level leads to productivity gains as manufacturing output increases. Second, output growth in manufacturing tends to increase the rate of productivity growth in other sectors of the economy because of labour reallocation. Thus, in the Kaldorian tradition, the manufacturing sector has been considered the main source of growth of economies, as it is characterised by the development of technical progress, capital accumulation, economies of scales (Szirmai and Verspagen, 2015), technological spillovers and high backward and forward linkage effects (Hirschman, 1958). Given the inherent characteristics of this sector, which may not be present in the services sector (Su and Yao, 2017), industrialisation of countries has typically been considered a pathway to output growth and development.

There is a sizeable literature that tests KGL in developed countries. Although evidence for the developing world is more limited, the fundamental role played by manufacturing in output growth has been also confirmed (i.e., Magacho and McCombie, 2017;

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Marconi et al., 2016; Pacheco and Thirlwall, 2014; Libânio and Moro, 2011; Felipe et al., 2009; Cimoli et al., 2005; Wells and Thirlwall, 2003; Felipe, 1998). However, over the last decades, the share of manufacturing in employment and value added is shrinking at much lower levels of income in comparison with early industrialisers. As a result, developing regions are becoming service-based societies faster than developed countries did (Bah, 2011) during their transition through development stages. Services sector growth represents a qualitatively new stage in the social structure of production and division of labour and, in the absence of sizable manufacturing industries, whether services activities can lead to economic growth in developing countries (Rodrik, 2016) is a matter of concern.

All in all, evidence on KGL has generally overlooked non-manufacturing sectors, including –at most– the aggregate services sector (i.e., Felipe et al., 2009; Wells and Thirlwall, 2003). However, certain service activities (i.e., ICT-related services) might also induce productivity growth in developing regions through the exploitation of scale economies (Dasgupta and Singh, 2007, 2005). The structural composition of services matters then for determining the sustainability of their particular contribution to productivity growth (Felipe et al., 2009), while it is important to distinguish between different categories within the heterogeneous services sector (Herrendorf et al., 2014). Sectoral disaggregation, beyond the standard three-sector focus, needs to be further considered in economic growth studies (Duarte and Restuccia, 2020; Eberhardt and Teal, 2013).

Only a handful of studies have tested KGL in developing countries by accounting for a sectoral disaggregation of services (i.e., Dasgupta et al., 2019; Di Meglio et al., 2018; Pieper, 2003). Evidence shows that similar productivity-growth connections that Kaldor uncovered for the manufacturing sector might also apply to specific service activities. In this vein, the present work tests Kaldor's first and second laws for services vis-à-vis manufacturing across developing regions using panel data techniques. It aims to contribute to the related literature in three different ways. Firstly, the sectoral disaggregation of services is considered by using the latest release of the Groningen Growth and Development Centre 10-Sector Database (Timmer et al., 2015). The use of this dataset allows us to enlarge the sample size of every sector panel in comparison with previous studies. Estimations are then based on a sample of 32 developing countries with information available for forty years (1970–2010).

Secondly, the paper examines and underlines the distinct role played by market and non-market services (government and personal services) as potential contributors to economic growth. While the Kaldorian framework assumes unproblematic productivity measures, the specific characteristics of non-market services (i.e., the absence of price, direct and indirect consumers, and collective consumption of the output) affect how productivity is defined and measured (Djellal and Gallouj, 2013). This highlights the need for caution regarding claims about the aggregate service sector, as they may be misleading. Moreover, in order to unmask differences which may remain hidden within the market services category, estimations are also performed for three specific branches: distributive trade and hospitality; transport and communications; and business-related activities. Thirdly, the econometric exercise is performed separately for Asia, Latin America, and Africa. Developing countries are themselves following diverse structural transformation processes (Bah, 2011), which have contributed differently to economic performance (MacMillan and Rodrik, 2011). Accordingly, the present work aims to provide a comparative view of the different role played by service activities across regions.

The paper is set out as follows. Section 2 briefly describes the structural change process followed by developing regions in recent decades. Section 3 presents the data and the empirical strategy.

The econometric results are analysed in Section 4. The last section discusses the major outcomes and limitations of the study and identifies future research paths.

2. Structural change in developing regions

In general, developed countries have all followed the same well-documented process of structural transformation: a declining share of agriculture in output as income per capita increased, followed by an inverted U-shape relationship between industry shares and income per capita and, finally, an increasing share of services. However, the structural change of developing countries seems to deviate from that traditional path. Several economies show large shares of services in output in early stages of development (Szirmai, 2012), as they are experiencing premature deindustrialisation (i.e., Palma, 2005). Since 1990, the hump-shaped relationship between industrialisation and income has shifted downwards and moved closer to the origin (Rodrik, 2016). To this respect, a number of developing countries have undergone a shift primarily from agriculture to services, with the manufacturing sector failing to take off or remaining constant at low levels of income (Dasgupta et al., 2019).

Fig. 1 shows sectoral growth patterns of Asia, Latin America and Africa. Employment shares are plotted against (the natural log of) income per capita for a pool of 32 countries during the period 1950–2010. The pattern of structural change followed by Asia over the last six decades, characterised by a manufacturing export-led development model, is, to some extent, more alike to that experienced by developed countries. Manufacturing employment shares show a hump-shaped curve that picks up to more than 20 per cent in several Asian economies (e.g., China, Malaysia, Korea, Taiwan, Singapore, and Hong Kong). Such a shape is less clear in Latin America, where employment shares in manufacturing remained rather constant at around 14 per cent, on average, over the last six decades, and only a few countries, such as Argentina and Chile, have exhibited shares higher than 20 per cent. On the other hand, the African continent has never gone through a proper industrialisation process (Aiginger and Rodrik, 2020). On average, manufacturing represented around 8 per cent of employment during the period 1950–2010,¹ whereas the agriculture sector remained predominant in many economies (e.g., Nigeria, Malawi, Zambia, and Tanzania), with employment shares greater than 60 per cent of total employment.

Overall, the figure highlights the importance of heterogeneity both across (and within) regions, and exhibits the increasing role of services during the past six decades. However, the growing specialization in services of developing countries may not necessarily lead to the stagnation of aggregate productivity (Triplett and Bosworth 2004), as the relatively low productivity rates of services vis-à-vis manufacturing are increasingly questioned. Challenging the traditional view that considers services unable to improve their efficiency, Timmer and de Vries (2009) suggest that market services seem to be the most important contributor to growth in developing Asia and Latin America from 1950 to 2005. The authors claim that market services prove to be major contributors to the increase in aggregate productivity, particularly, during periods of accelerated growth. Nevertheless, when the country sample and the time horizon analysed are expanded, the role played by services in growth may considerably differ (Timmer et al., 2015).

At country level, Lee and McKibbin (2018) show that in several Asian economies (i.e., Hong Kong, China, India, Malaysia,

¹ Save the exception of Mauritius, where the manufacturing employment share slightly surpassed 30 per cent mainly because of the relevance of the textile industry.

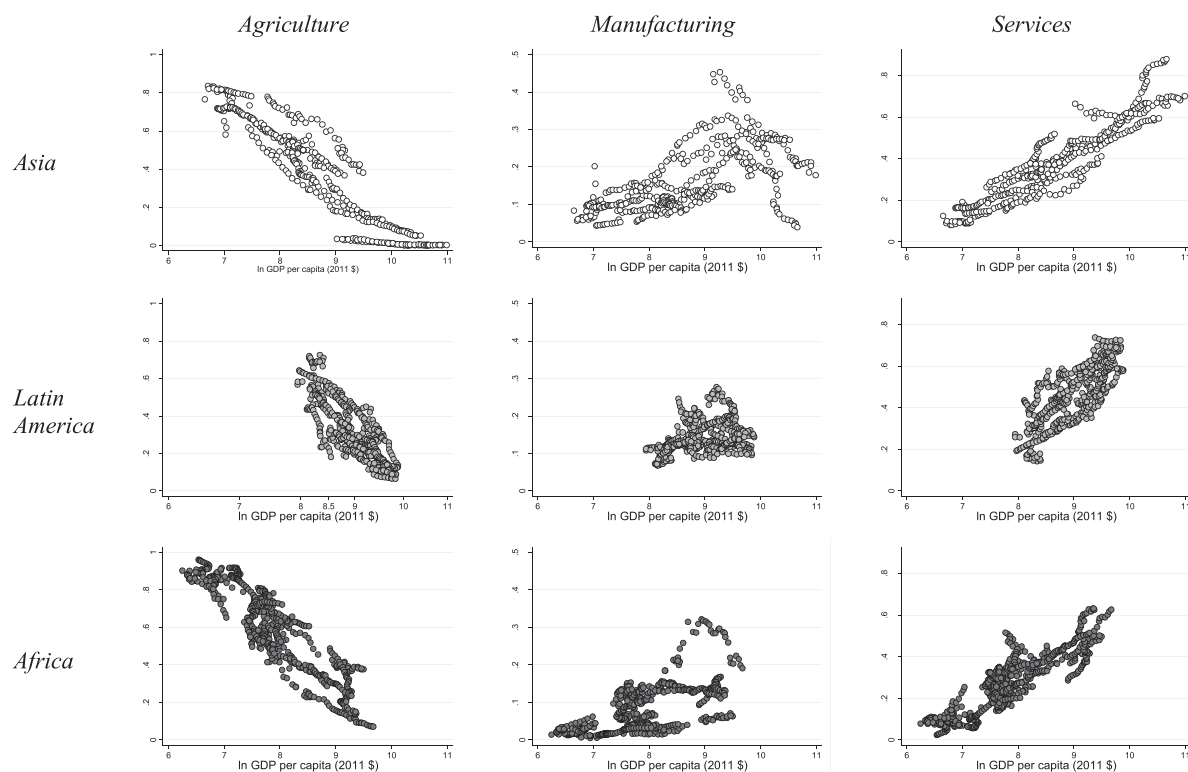


Fig. 1. Sectoral transformation across countries, 1950–2010.

Note: Agriculture includes sectors A–B of ISIC Rev.3., Manufacturing sector D and Services sectors G–P. Data on income per capita reflects real gross domestic product (GDP) at constant prices in millions of 2011 dollars and population. The country sample includes nine countries from Latin America, 10 from Asia and 13 from Africa; see Section 3 for more details.

Source: GGDC 10-Sector Database and Penn World Table 9.0 Database (Feenstra et al., 2015).

and Taiwan) the services sector positively contributed to aggregate productivity growth during 1990–2005, both through within productivity growth and structural change effects, exceeding the net contribution of the manufacturing sector. This is particularly the case for some services branches (i.e., transportation, communications, financial intermediation, and business services), which have experienced high productivity growth. In this vein, Park and Shin (2012) find that, over the period 2000–2010, a number of Asian countries (China, Hong Kong, India, Indonesia, Malaysia, Pakistan and Vietnam) have been able to achieve substantial productivity gains in the services sector. According to Ghani (2010), during the period 1980–1985 and 2000–2007, the contribution of services to GDP growth has doubled that of industry in South Asian countries (Bangladesh, India, Sri Lanka, Pakistan), while in East Asian economies industry has contributed more than services to growth.

There is also evidence of the importance of services as a fundamental source of productivity growth in a number of African countries (e.g., Botswana, Cape Verde, Rwanda and Zambia) over the period 1991–2013 (Balchin et al., 2016). Similarly, Kabeta and Sidhu (2016) conclude that, between 2005 and 2013, growth in Ethiopian GDP per capita can be mostly associated with productivity growth resulting from service sectors, while the Rwandan case also highlights the contribution of services to output growth over the last decades (Ggombe and Newfarmer, 2018). Finally, high productivity in services explains why structural change positively contributed to aggregate productivity growth in countries such as Costa Rica and Mexico between 1990 and 2005 (Schiffbauer et al., 2016).

Productivity growth in the services sector has been extensively favoured by the increasing tradability of services and the information and communication technology (ICT) revolution, which is

eroding the advantages that manufacturing and agriculture traditionally had in the trade/globalisation sphere (Dasgupta and Singh, 2005). Services exports shares from developing countries increased from 3 per cent to over 20 per cent between 1970 and 2015 (Loungani et al., 2017), with most Asian countries showing higher shares of service exports relatively to other developing areas (Park and Shin, 2012). Given the increased ability to fragment or divide production processes into smaller functions (Krugman, 2000), global value chains of production have expanded and significantly stimulated the development and use of specialised service activities worldwide. The ease with which they can be transmitted over long distances facilitates the development of specialist service providers, which exhibit high knowledge-intensive dynamics beyond traditional Baumolian (Baumol, 1967) stagnant sectors.

Knowledge-based services, in particular, are increasingly considered to be major users, originators and transfer agents of technological and non-technological innovations, playing a major role in creating, gathering and diffusing organisational, institutional and social knowledge (Shearmur and Doloreux, 2019; Gallego and Maroto, 2015; den Hertog, 2000). Some service sub-sectors (i.e., telecommunications, financial services, and business-related services) have completely broken-down old conventions and have turned into major productive (van Ark et al., 2003) and innovative activities, and, in some cases, have increased their productivity rates faster than the average of the economy (Castaldi, 2009). As intermediate inputs, this branch of services positively influences competitive advantage and economic growth because of their capacity to perform dynamic functions, positive externalities, and efficiency gains, as they facilitate, adopt, transfer and generate useful innovation for the rest of the economic sectors.

All in all, and given the different paths followed by the three major regions, results from the empirical analysis are expected to reflect a dissimilar impact of structural transformation on output growth. On the one hand, manufacturing is hypothesised to behave as a driving force of economic growth, as previously confirmed by the Kaldorian literature across a number of Asian (Felipe et al., 2009), Latin American (Libânio and Moro, 2011), and African (Wells and Thirlwall, 2003) countries. On the other hand, as described above, market services are also expected to play a relevant role in output growth.

At a more disaggregated level, business-related services might also be found to fuel growth (i.e., Di Meglio et al., 2018). Given the strong inter-sectoral linkages between these modern services and manufacturing, this fuelling effect might turn into a fundamental triggering pathway for growth in those developing regions with an important industrial base. Nevertheless, raising productivity in knowledge-based services has typically required, amongst other factors, steady and broad-based accumulation of capabilities in human capital (Rodrik, 2018), which may not be predominant in some developing areas where low-skilled labour forces prevail. Therefore, the level of input sophistication required to develop services with a higher knowledge content might prevent them to act as an escalator sector in some of the regions analysed.

3. Methodology and data

The research tests Kaldor's first and second laws using a balanced sectoral panel data of 32 developing countries with information available for the period 1970–2010. The first law states that there is a causal relationship running from sectoral (manufacturing) output growth (q_j) to gross domestic product growth (q_{GDP}). Following Thirlwall (2013), the linear specification can be written as follows:

$$q_{GDP_t} = \alpha_{1j} + \beta_{1j}q_{jit} + \varepsilon_{jit} \text{ with } \beta_1 > 0 \quad (\text{I-A})$$

where j , i , t stand for sector, country, and time, respectively, q_{jit} refers to the sectoral output growth (the growth of sectoral value added in constant prices), and ε_{jit} is assumed to be normally distributed.

However, Thirlwall (2003) and Wells and Thirlwall (2003) proposed two additional regressions to overcome the problem of spurious correlation that is evidently present in Equation I-A.² On the one hand, Equation I-B regresses the output growth of the non-manufacturing sector (q_{nj}) on the output growth of manufacturing (q_j). This aims to estimate the impact of manufacturing growth on the rest of the economy:

$$q_{njt} = \alpha_{2j} + \beta_{2j}q_{jit} + \varepsilon_{jit} \text{ with } \beta_2 > 0 \quad (\text{I-B})$$

On the other hand, Equation I-C regresses GDP growth (q_{GDP}) on the excess of growth of the manufacturing output (q_j) relative to the growth of the non-manufacturing output (q_{nj}):

$$q_{GDP_t} = \alpha_{3j} + \beta_{3j}(q_{jit} - q_{njt}) + \varepsilon_{jit} \text{ with } \beta_3 > 0 \quad (\text{I-C})$$

Kaldor's second law³ suggests a positive relationship between the growth of manufacturing output and the growth of productivity in manufacturing as a result of increasing returns to scale. The law proposes that the expansion of manufacturing output promotes 'learning by doing' and induces technical progress, thereby increasing productivity. This causes a less than proportional growth in manufacturing employment (e_j). Therefore, the higher the scale

economies in the manufacturing sector are, the lower the elasticity of employment with respect to output. Accordingly, the second law can be specified as follows:

$$e_{jit} = \alpha_{4j} + \beta_{4j}q_{jit} + \varepsilon_{jit} \text{ with } 0 < \beta_4 < 1 \quad (\text{II})$$

The main data source is the updated and extended Groningen Growth and Development Centre (GGDC) 10-Sector Database (Timmer et al., 2015). This is a unique database for developing countries that computes yearly data on gross value added (at constant 2005 prices) and employment for more than five decades. The number of persons employed is computed using information from labour force surveys, business surveys and population census. Therefore, it includes paid workers but also self-employed, family workers and other informal workers. This is relevant in the context of developing economies, where these categories may account for a large share of total employment. However, since data on value added is computed within the System of National Accounts, the coverage of the informal sector differs across countries depending on the quality of the national sources.

The country sample includes, as displayed in Table 1, nine countries from Latin America, 10 countries from Asia, and 13 countries from Africa. The year 1970 was chosen as a starting point as data for the whole sample of countries is available from that time on. Time series available in the GGDC 10-Sector Database are broken down into 10 activity sectors (ISIC Rev. 3.1). As a number of countries do not distinguish between the 'Government Services' sector and the 'Personal Services' sector, we aggregate data for these two activities into a single sector, named 'Non-Market Services' (i.e., McMillan et al., 2014; McMillan and Rodrik, 2011). For the sake of comparison, two additional series have been constructed and included in the analysis: 'Market Services' and 'Total Services'. All in all, the econometric exercise is performed for seven different sectors (j), as detailed in Table 2: 1) Total manufacturing (D); 2) Total services (G-P); 3) Market services (G-K); 4) Distributive trade and hospitality (G-H); 5) Transport and communication (I); 6) Business services (J-K); and 7) Non-market services (L-P).⁴

Equations are estimated by Ordinary Least Squares with Panel Corrected Standard Errors (PCSE) that account for groupwise heteroscedasticity, cross-sectional dependence, and autocorrelation in disturbances within panels.⁵ Fixed country effects are added in each sectoral estimation to deal with omitted heterogeneity. Moreover, outliers are detected and treated by using one dummy variable for each. To avoid the problems of cyclical fluctuations present in the annual (value added at constant prices and employment) series, we use five-year averages of data based on log-growth rates (Pieper, 2003) to smooth out short-term variations. In this way, we do not conflate the long-term relationships proposed by Kaldor with the short-term cyclical relationship described by Okun's law (Dasgupta and Singh, 2007).⁶

Sectoral estimations are performed for the whole sample of developing countries and, separately, for the Asian, Latin American, and African sub-samples. Based on the five-year growth rates ($t = 8$) for the 32 countries ($i = 32$), every sector panel ($j = 7$) includes 256 observations for the whole sample. The Asian sub-sample has 80 data points ($i = 10$ and $t = 8$) for each sector panel. The Latin American sub-sample has 72 observations ($i = 9$ and $t = 8$). For the African countries, each sector panel includes 104 observations ($i = 13$ and $t = 8$).

⁴ Despite the existence and use of other taxonomies of service industries in the literature (i.e., Bogliciano and Pianta, 2016), they are not feasible to be approached due to design of the dataset.

⁵ The Modified Wald test for groupwise heteroscedasticity, the Wooldridge test for autocorrelation in panel data and the Pesaran test of cross-sectional independence are implemented.

⁶ Okun (1962) identified a negative statistical relationship between the growth of output during the business cycle and the growth of unemployment.

² By definition, total output growth is the weighted sum of sectoral output growth.

³ Commonly known as Verdoorn's Law after the Dutch economist P.J. Verdoorn, who found such a relationship in the case of Eastern European countries in the 1940s.

Table 1
Countries by developing region.

Region	Name	Country
Asia	ASI	China, Hong Kong (China), India, Indonesia, Rep. of Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand
Latin America	LAT	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Venezuela
Africa	AFR	Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania, Zambia, Egypt and Morocco

Table 2
Description of sectoral composition ISIC Rev. 3.1.

<i>j</i>	Sector	Name	Description	Code
1	Manufacturing	MAN	Total manufacturing	D
2	Services	SER	Total services	G-P
3	Market services	MKS	Market services	G-K
4	Distributive trade and hospitality	DTH	Wholesale and retail trade, restaurants, and hotels	G-H
			Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel	50
			Wholesale trade and commission trade, except of motor vehicles and motorcycles	51
			Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods	52
			Hotels and restaurants	55
5	Transport and communication	TRC	Transport, storage, and communication	I
			Land transport; transport via pipelines	60
			Water transport	61
			Air transport	62
			Supporting and auxiliary transport activities; activities of travel agencies	63
			Post and telecommunications	64
6	Business activities	BUS	Finance, insurance, real estate, and business services	J-K
			Financial intermediation, except insurance and pension funding	65
			Insurance and pension funding, except compulsory social security	66
			Activities auxiliary to financial intermediation	67
			Real estate activities	70
			Renting of machinery and equipment without operator and of personal and household goods	71
			Computer and related activities	72
			Research and development	73
			Other business activities	74
7	Non-market services	N-MKS	Government services	L-N
			Public administration and defence; compulsory social security	75
			Education	80
			Health and social work	85
			Personal services	O-P
			Sewage and refuse disposal, sanitation, and similar activities	90
			Activities of membership organisations	91
			Recreational, cultural, and sporting activities	92
			Other service activities	93
			Activities of private households as employers of domestic staff	95
			Undifferentiated goods-producing activities of private households for own use	96
			Undifferentiated service-producing activities of private households for own use	97

4. Results and discussion

Panel data estimations of Kaldor's first law are shown in Tables 3 and 4, which present results for both the whole sample of developing countries and across the three major regions in the analysis. Our findings suggest that, as proposed in the classical industrialisation hypothesis, a relationship does exist between the growth of manufacturing output and the growth of GDP. Yet, a positive and significant liaison can also be found as regards the services sector. As a matter of fact, Equation I-A in Table 3 shows, with respect to the manufacturing industry, an even stronger association between services sector output and GDP growth. Similar results are observed with reference to Equation I-B, as the higher the output growth of service activities is, the higher the levels of output growth in the rest of the aggregate economic sectors.

Hence, although manufacturing contribution remains important, over the last few decades growth in total output of developing regions has been mostly accompanied by the expansion of both market and non-market services. This pattern is present across the three regions analysed and comes to support the change in the classical path of economic transformation. As exhibited in Table 4 (Equations I-A and I-B), the increasing share of market services within the structural composition of developing regions has been driven mainly by distributive trade (in Asia and Africa) and by

transport and communication activities (in Latin America), rather than by modern business service activities, which show a relatively lower contribution to output growth.

When equation I-C is tested, the results in Table 3 show how the excess of manufacturing over non-manufacturing output growth enhances the expansion of developing economies. This pattern can be particularly identified in Asia and Latin America, where manufacturing seems to have fuelled economic growth over the last few decades. These findings are in line with previous estimations of Kaldor's first law in developing countries, as presented in Section 2. In the African region, however, we cannot infer a similar result. This may be explained by the stagnation of the manufacturing industry, whose size, diversity, and sophistication has lagged behind other developing areas over the last decades (Page, 2012).

Interestingly, while the regression coefficient of Equation I-C is not significant for the aggregated services sector, market services are found to have a similar behaviour vis-à-vis manufacturing. Table 3 shows positive and significant coefficients for Equation I-C in the developing world, as well as in the Asian and Latin American regions. Accordingly, while the results align with previous evidence based on growth accounting exercises, they also support the role played by market services in fuelling income growth in developing economies 'à la Kaldor'. In Africa, alike the results for the manufacturing industry, no significant coefficients are found for market

Table 3
Panel data estimation of Kaldor's first law, aggregate sectors.

Region	N	Sector	Equation I-A (β_1)	Equation I-B (β_2)	Equation I-C (β_3)
ALL	256	MAN	0.4375***	0.3539***	0.1108**
		SER	0.8602***	0.6659***	-0.0897
		MKS	0.6284***	0.5035***	0.1212**
		N-MKS	0.5161***	0.4480***	-0.3582***
ASI	80	MAN	0.4662***	0.3383***	0.2585***
		SER	0.8919***	0.7797***	-0.1098
		MKS	0.7209***	0.6108***	0.3926***
		N-MKS	0.6632***	0.5355***	-0.5516***
LAT	72	MAN	0.6739***	0.5690***	0.3150***
		SER	0.9175***	0.8399***	-0.1218
		MKS	0.6816***	0.5163***	0.2320**
		N-MKS	0.6969***	0.6277***	-0.4694***
AFR	104	MAN	0.3913***	0.3310***	0.0664
		SER	0.7178***	0.5442***	-0.0646
		MKS	0.5778***	0.4351***	0.04910
		N-MKS	0.3725***	0.2713**	-0.2679***

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Constant terms and country fixed effects are included in every equation.

Table 4
Panel data estimation of Kaldor's first law, market services.

Region	N	Sector	Equation I-A (β_1)	Equation I-B (β_2)	Equation I-C (β_3)
ALL	256	DTH	0.5519***	0.4757***	0.0712
		TRC	0.4436***	0.3949***	0.0204
		BUS	0.2591***	0.2071***	0.1181***
ASI	80	DTH	0.5956***	0.5143***	0.3437***
		TRC	0.4745***	0.4709***	-0.2937***
		BUS	0.2783***	0.2218***	0.1930***
LAT	72	DTH	0.5380***	0.5068***	0.2744***
		TRC	0.6003***	0.5728***	0.1707
		BUS	0.3577***	0.2900***	0.1077
AFR	104	DTH	0.5298***	0.4497***	0.0068
		TRC	0.3647***	0.3198***	0.1462*
		BUS	0.2044***	0.1765***	0.0351

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Constant terms and country fixed effects are included in every equation.

services. The structural change that has recently taken place in some African countries has mainly involved the reallocation of the labour force into traditional activities, such as retail and food and beverages services in the informal economy (i.e., Ellis et al., 2018).

Within the heterogeneous market services category, the business services sector seems to have the most important role as an engine of growth. The coefficient estimated for this sector in Equation I-C (Table 4) is positive and significant for the whole sample of developing countries. Accordingly, results suggest that business services have also acted as an escalator sector over the last few decades in the developing world. However, when looking into regions, this finding only applies to the case of Asia, where the additional growth of business services over the rest of the economic sectors is positively and significantly driving total output growth. As previously suggested, the larger manufacturing base, together with a relatively higher integration in global value chains, may have favoured the development of highly performing business-related services in the Asian region, whose knowledge generation and diffusion activities have promoted the emergence of aggregate productivity gains.

Additionally, in line with some previous findings, the distributive trade sector seems to have exerted an important positive effect on economic growth in both Asia and Latin America, as estimates of Equation I-C for these two regions are significant at the 1 per cent level. Productivity improvements along the entire sector can be extremely difficult in developing countries, in view of the heterogeneity of organizational forms and the range of prerequisites across different segments (Rodrik, 2018). However, certain Latin American countries (i.e., Costa Rica and Mexico) have achieved an important degree of formalization in distributive trade

(Schiffbauer et al., 2016) related to the emergence of large-scale formats. Finally, the branch of transport and communication activities also satisfies Equation I-C in Africa, although only at the 10 per cent level of significance.

The results in Table 3 for Equation I-C also reveal a negative and significant relationship between the rise of non-market services and output growth in developing regions. This negative liaison might be a reflection of the problems linked to the accounting of output figures in this specific sector. Given the lack of data on prices in national accounts, non-market value added services have traditionally been approached from input instead of output measures, introducing a notable distortion in the estimation of results. Both conceptually and methodologically, non-market services are a major challenge to the concept of output and productivity (Djellal and Gallouj, 2013), as they perform different activities for citizens and businesses that are not easy to evaluate on the basis of traditional measures (Di Meglio et al., 2015).

Tables 5 and 6 report panel data estimations for Equation II. According to Kaldor, a sufficient condition for the existence of increasing returns of scale (IRS) at the sectoral level regards the existence of a statistically significant relationship between employment growth and output growth, with a regression coefficient that is significantly less than unity. Therefore, this hypothesis is tested ($\beta_{4j} < 1$) along with the null hypothesis of constant returns of scale (CRS, $\beta_{4j} = 1$). The results show significant employment elasticities for both the manufacturing industry and the services sector, which leads to rejecting the CRS hypothesis. In particular, the estimated employment elasticity of the manufacturing sector is 0.48 for the overall sample of developing countries, a finding that is consistent with previous evidence (i.e., Felipe et al., 2009; Pieper, 2003).

Table 5
Panel data estimation of Kaldor's second law, aggregate sectors.

Region	N	Sector	β_4	$H_0: \beta_4 = 1$	$H_0: \beta_4 < 1$
ALL	255	MAN	0.4868***	Reject H_0	Retain H_0
		SER	0.2306***	Reject H_0	Retain H_0
		MKS	0.3088***	Reject H_0	Retain H_0
		N-MKS	0.3019***	Reject H_0	Retain H_0
ASI	79	MAN	0.6984***	Reject H_0	Retain H_0
		SER	0.1741**	Reject H_0	Retain H_0
		MKS	0.1993***	Reject H_0	Retain H_0
		N-MKS	0.2701**	Reject H_0	Retain H_0
LAT	72	MAN	0.3587***	Reject H_0	Retain H_0
		SER	0.2185***	Reject H_0	Retain H_0
		MKS	0.2598***	Reject H_0	Retain H_0
		N-MKS	0.3833***	Reject H_0	Retain H_0
AFR	104	MAN	0.4479***	Reject H_0	Retain H_0
		SER	0.2475***	Reject H_0	Retain H_0
		MKS	0.4397***	Reject H_0	Retain H_0
		N-MKS	0.2857***	Reject H_0	Retain H_0

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Constant terms and country fixed effects are included.

Table 6
Panel data estimation of Kaldor's second law, market services.

Region	N	Sector	β_4	$H_0: \beta_4 = 1$	$H_0: \beta_4 < 1$
ALL	255	DTH	0.2447***	Reject H_0	Retain H_0
		TRC	0.3927***	Reject H_0	Retain H_0
		BUS	0.2133***	Reject H_0	Retain H_0
ASI	79	DTH	0.1492**	Reject H_0	Retain H_0
		TRC	0.1338		
		BUS	0.1704**	Reject H_0	Retain H_0
LAT	72	DTH	0.1948**	Reject H_0	Retain H_0
		TRC	0.3212***	Reject H_0	Retain H_0
		BUS	0.3047***	Reject H_0	Retain H_0
AFR	104	DTH	0.3564***	Reject H_0	Retain H_0
		TRC	0.5478***	Reject H_0	Retain H_0
		BUS	0.1865***	Reject H_0	Retain H_0

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Constant terms and country fixed effects are included.

Interestingly, results indicate stronger IRS in both market and non-market services in comparison with manufacturing industry, which emphasises services' capability of contributing to overall productivity and output growth in developing regions. Within the market services category, business service activities, together with distributive trade, exhibit the strongest IRS. This pattern can be detected for both the whole sample of countries and the three regions analysed, where these two service branches exhibit the highest levels of (within) productivity growth. In particular, business services have exhibited the potential to trigger output growth in the different developing regions (as identified through Equations I-A, I-B and I-C) and also the potential to reach important productivity gains (as identified in Equation II). Accordingly, they closely resemble manufacturing in the Kaldorian sense, and given its ability to promote the emergence of backward and forward linked sectors, this service branch has become a key economic growth driver in developing regions.

5. Concluding remarks

The research primarily aims to shed some light on the potential contribution of a variety of economic sectors to aggregate productivity growth in Asia, Latin America and Africa over forty years (1970–2010). The evidence shows the rise of services along with a declining participation of manufacturing in the developing world. However, given the diverse paths of structural transformation followed by the three major regions, the work seeks to disentangle whether certain service activities may act as escalators to create positive effects on economic growth. In doing so, the analysis tests Kaldor's first and second laws from a sectoral perspective, includ-

ing market services and non-market services vis-à-vis manufacturing.

Our findings confirm that manufacturing has behaved as an engine of growth. Over the last few decades, this industry has shown strong IRS, while the additional growth of this sector over other economic activities has fuelled GDP growth, particularly in the Asian and Latin American regions. Such a relationship is not found in Africa, where countries are relatively under industrialised (Rodrik, 2018). The African proportion of manufacturing workers in the total labour force has remained too small to offer a substantial push to aggregate growth (Austin et al., 2017), leading some observers to question Africa's ability to catch up (Newfarmer et al., 2018). The growth-enhancing capacity, however, seems not to be exclusive of manufacturing, as we find similar behaviours in market services, which have also proved to play a leading role in Asia and Latin America. Within this heterogeneous sector, business services exhibit a strong potential to trigger economic activity and performance.

This specific service branch is characterised by a relatively high intensity (embodying and enabling the use) of knowledge and technology, strong (forward and backward) inter-industry linkages (López-Gonzalez et al., 2019; Meliciani and Savona, 2015; Guerrieri and Meliciani, 2005; Ciarli et al., 2012), as well as a symbiotic relationship with the manufacturing industry (Dasgupta et al., 2019; Di Meglio et al., 2018; Roncolato and Kucera, 2014). Their role as fundamental contributors to economic growth is of particular relevance in the Asian region, where several countries have already transitioned to the inverted U-shape relationship between manufacturing and income per capita. Nevertheless, the fact that employment in these business activities is relatively small raises some concerns. Some traditional services (e.g.,

distributive trade) have also exhibited the potential to contribute to aggregate productivity growth, both in Asia and Latin America. Moreover, our findings reflect the conceptual and methodological challenges that non-market services pose to conventional productivity measures, as well as their impact on the aggregate services sector estimations.

Political and academic discussion has recently refocused its attention on the 'reindustrialisation' of countries and the fostering of industrial policies as a means to achieving sustainable growth paths (Westkämper, 2014; Tregenna, 2011). The results of this work align with the importance of developing and sustaining a core (technology-intensive) manufacturing sector. However, as also discussed by Dasgupta et al. (2019), manufacturing contribution to growth has weakened over time, while that of services has become stronger. Moreover, between 1995 and 2010, manufacturing seemed to have lost its relative importance in terms of linkages in favour of services (Ferreira-Gabriel and de Santana Ribeiro, 2019) in developing countries. Thus, beyond the development and upgrading of the manufacturing sector, capabilities need to be promoted in other dynamic economic activities for the sustaining of long-run economic growth.

Market services have exhibited important productivity improvements in developing regions over the last few decades and, as previously shown, have proved to be crucial contributors to output growth. Some (e.g., distributive trade) are certainly contingent on the expansion of manufacturing production (Dasgupta and Singh, 2007). Other advanced innovative services may be recognised as a dynamic branch of economies on which growth may depend. Hence, when looking at the connections between productive structures and economic growth, sectoral heterogeneity matters. Yet, the increasing mutual dependence between manufacturing and services implies that, as suggested by Jia et al. (2019), any policy that prioritises one at the cost of the other might lead to inhibiting economic growth. A renewed version of industrial policy may need to draw attention to knowledge- and technology-based services with strong inter-industry linkages. Countries benefiting the most from a service-based economic model are characterised by developing the greatest interrelationships between manufacturing and services (Windrum and Tomlinson, 2010). Policies seeking to promote growth and development through productive diversification (Aiginger and Rodrik, 2020) should be orientated to modern and dynamic activities, including both services and manufacturing.

6. Limitations and research agenda

Several caveats apply to our analysis. First, a clear-cut distinction between service and manufacturing industries is debatable, as their boundaries have become more and more permeable. Second, a note of caution should be also offered as regards Kaldor's second law. Our estimations do not control for the contribution of capital stock to productivity growth. If, as suggested by Kaldor, some kind of technical progress function underlies the law, the exclusion of this variable is likely to provide biased coefficients. Some studies have considered the expansion of capital when estimating this law (Marconi et al., 2016; Libânio and Moro, 2011). However, the lack of consistent data on capital stocks at the sectoral level for those developing countries analysed hindered their inclusion in this research. In addition, our estimations hold constant other factors that also influence productivity growth at the sector level, such as between-sector interactions and technology spillovers. In particular, if technical development differs across countries, sectoral productivity gains may reflect the catch-up of laggard countries instead of increasing returns of scale. Some scholars have dealt with this issue by using control variables for the level of technical progress or cross-regional data. Nevertheless, such solu-

tions are difficult to implement with the currently available data on developing regions at a disaggregated sector level.

A number of future avenues are open in the context of this research. First, heterogeneity across countries with distinct income levels needs to be further explored when looking at sectoral engines of growth. Second, the estimation of KGL remains an econometric challenge. There is still room for further improvements as regards the use, for instance, of instrumental variable estimations or non-linear estimations. Third, an input-output analysis might allow a better understanding of the relative contribution of final and intermediate demand to changes in the sectoral structure of developing economies. Fourth, the third KGL needs consideration to further understand how reallocation of labour towards sectors subject to increasing returns of scale induces overall productivity and output growth. Finally, it would be interesting to take into account the heterogeneity of the manufacturing sector itself, along with a further disaggregation of the different service branches, in order to gain insights about specific knowledge-intensive engines of growth in developing regions.

Author statement

We the undersigned declare that this manuscript is an original work, has not been published elsewhere and it is not under editorial review for publication at another journal.

We confirm that all authors have seen and approved the final version of the manuscript being submitted. We further warrant that the order of authors listed in the manuscript has been approved by all of us.

Declaration of Competing Interest

None.

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