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Services in Developing Economies: The Deindustrialization Debate in Perspective

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ABSTRACT

This study contributes to the debate on the premature deindustrialization of developing countries by analysing the contribution of services to aggregate productivity and output growth within a Kaldorian framework. The article revisits Kaldor's Growth Laws and empirically tests them for a number of economic activities, including four service branches across 29 developing economies in Asia, Latin America and sub-Saharan Africa over three decades (1975–2005). Panel data estimations are complemented by a shift-share decomposition of labour productivity growth. The findings support the Kaldorian argument for both manufacturing and business services' contribution to aggregate productivity growth. Conversely, other services slow down aggregate productivity and output growth. The authors suggest qualifying and repositioning the debate on premature deindustrialization within a broader reflection on the opportunities for development linked to structural change. The analysis claims that these opportunities might include not only manufacturing sectors, but also business services.

INTRODUCTION AND BACKGROUND

The role of structural change has been core to theories of economic development for several decades now. The structure of an economy matters for growth performance and development since sectors have different capabilities to achieve and to induce productivity gains, and to benefit from domestic and foreign demand growth (Cimoli et al., 2009; Thirlwall, 2013). Processes of structural transformation have been heterogeneous both across and within developing countries (Bah, 2011), leading to different contributions to economic performance (McMillan and Rodrik, 2011).

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A renewed interest in the relationship between structural change and development has recently been emerging, particularly at a time when deindustrialization is occurring at low levels of per capita income in developing countries. This is unlike the path that has historically characterized developed countries (Bah, 2011; Di Meglio, 2017; Rodrik, 2016). Concerns of a premature deindustrialization of developing countries (Dasgupta and Singh, 2005, 2006; Felipe et al., 2015; Palma, 2005; Rodrik, 2016) are consistent with a revamped debate on the role of industrial policy (Stiglitz and Lin, 2013; Storm, 2015) and the recent plea for countries to 'reindustrialize' (Ciarli and Di Maio, 2013; Tregenna, 2011; Westkämper, 2014).

Much of the scholarship that fuels concerns about premature deindustrialization implicitly assumes the seminal Kaldorian stylized facts. These depict the manufacturing sector as the main driver of labour productivity performance, growth and, ultimately, economic development (Kaldor, 1966, 1967; Thirlwall, 1983). Kaldor's Growth Laws (KGL) propose that industrialization induces growth of the output per worker as a result of two main mechanisms. First, productivity in manufacturing rises with the growth of manufacturing output due to the presence of increasing returns to scale (IRS) at the sectoral level. Second, output growth in manufacturing is shown to positively affect the rate of productivity growth in other sectors. Over time, several other studies have examined and confirmed the interpretation and the validity of the different KGL from a variety of perspectives. The evidence abounds in regard to developed economies.[1] However, it remains fairly fragmented with respect to developing countries.

The fundamental role played by manufacturing as a source of growth in developing countries is shown, among others, by Felipe (1998) across five Southeast Asian countries, by Cimoli et al. (2005) and Libanio and Moro (2006) across five and seven Latin American economies, respectively, and by Pacheco and Thirwall (2014) for 89 developing economies. However, given the traditional picture of services as a structural burden for economies, the literature has mostly overlooked non-manufacturing sectors (Ocampo, 2005), while the few studies that focus on services mainly account for the aggregate sector. In this respect, Dasgupta and Singh (2005, 2006) have pioneered the argument that, although manufacturing continues to be critical for development, services can also be regarded as an additional engine of growth. In the same vein, Felipe et al. (2009) argue that in the case of Asia, notwithstanding the heterogeneity of the productive structure within this macro-region, services can also have productivity growth inducing effects through the exploitation of scale economies.

The cross-sector performance of services is heterogeneous. Some service sectors, particularly knowledge-intensive and other business-related

1. See Romero (2016) for a review.

services,[2] have challenged the 'old myths' of services as a structural burden (Gallouj and Savona, 2008) and have turned into important sources of productivity growth also in developing countries (Timmer and de Vries, 2007, 2009). Therefore, country-level processes of deindustrialization should be assessed by distinguishing the roles that different service branches may have in the economy.

The aim of this article is to add to the recent debate on premature deindustrialization of developing countries, particularly to reposition the debate within a broader reflection on the opportunities for development linked to structural change. To do so, we build upon and extend the Kaldorian framework to include a number of service branches. The novelty of the empirical strategy is twofold: first, we implement econometric tests of the KGL on a number of industries, including four service subsectors, across 29 developing countries from Asia, Latin America and sub-Saharan Africa over the last three decades (1975–2005). To our knowledge, no prior study has tested the validity of the Kaldorian stylized facts for services at this level of disaggregation. Second, panel data estimations are complemented with a decomposition of labour productivity growth, by means of a shift-share analysis, in order to study how resource (labour) reallocation during the process of structural change has affected economic and labour productivity growth.[3] Overall, this research also fills a gap in the current literature by revisiting the three KGL for agriculture, manufacturing and services and examining the role played by different service subsectors in economic performance across Asian, Latin American and African developing countries.

The article is structured as follows. Having provided some background on premature deindustrialization, the following section revisits the classical Kaldorian framework. The subsequent two sections then present the data and the empirical strategy of this study, and discuss the econometric results. The last two sections summarize the main findings and conclude by identifying priorities for future research.

We find support for the Kaldorian argument for manufacturing sectors across all the macro regions that form the object of our analysis. We also find robust empirical support for it in the branch of business services. However, other services — including personal and informal ones — represent a structural burden for aggregate productivity and output growth. Importantly, we qualify the heterogeneous patterns of structural change that have

2. Knowledge-intensive services usually include: computer and related activities (K72 ISIC code); research and development (K73); and other business activities (K74), such as engineering, technical consultancy, legal aid and other business services.
3. Our research focuses exclusively on changes in the reallocation of labour across sectors. However, we are aware that structural change is a much broader concept encompassing several other transformations taking place in the economy, for example, in savings and investments rates, in urbanization, in institutions, etc. (Matsuyama, 2009).

characterized the different macro areas and have explained their heterogeneous economic performance.

THE KALDORIAN FRAMEWORK

In his seminal contributions, Nicholas Kaldor (1966, 1967) attempts to explain large growth rate differences across 12 OECD countries during 1953–64, by adopting a sectoral approach where dualisms à la Lewis (Lewis, 1954) can be found.[4] Kaldor argues that both the production and demand characteristics of each aggregate sector of the economy (agriculture, industry and services) matter for economic growth. In particular, the capital-intensive manufacturing sector shows greater potential for productivity growth than other sectors due to the presence of both static and dynamic economies of scale. Accordingly, the reallocation of labour from activities subject to diminishing returns of scale (namely, agriculture) to more productive sectors (for example, manufacturing) fosters productivity growth in both sectors and overall output expansion. Manufacturing also has greater potential than other sectors for releasing balance of payment constraints due to the higher tradability of manufactured products. Therefore, external demand growth of such products may spark a virtuous circle of cumulative growth (Dixon and Thirlwall, 1975; Kaldor, 1970). Within this framework, Kaldor articulates a set of long-run relationships or empirical generalizations of growth of output, employment and productivity at the sectoral level of the economy, which became known as Kaldor's Growth Laws (KGL).

Kaldor's Growth Laws

Kaldor's First Law states that the faster the growth of manufacturing output (q_m) in an economy, the faster the growth of gross domestic product (q_{GDP}). Kaldor identifies a *causal* relationship running from sectoral to aggregate growth and, more specifically, from manufacturing growth to the growth rate of GDP per worker (Ros, 2000), as shown in Kaldor's Second and Third Laws. The first law can thus be posited as:

$$q_{GDP} = f_1(q_m) \qquad f'_1 > 0$$

According to Thirlwall (2013), there are two additional regressions that overcome the problem of spurious correlation that is evidently present in the former specification:[5]

$$q_{GDP} = f_1(q_m - q_{nm}) \qquad f_1' > 0$$
$$q_{nm} = f_1(q_m) \qquad f_1' > 0$$

4. For a review of Kaldor's contributions to development economics, see Targetti (2005).
5. Since total output growth is the weighted sum of sectoral output growth.

In the first equation, the growth of GDP (q_{GDP}) is regressed on the excess of the growth of manufacturing production (q_m) relative to the growth of non-manufacturing production (q_{nm}). In the second equation, the growth of non-manufacturing output is regressed on the growth of manufacturing output, the estimated coefficient indicating the strength and size of the impact of manufacturing sector growth on the rest of the economy.

Accordingly, the linear specifications for examining Kaldor's First Law at sectoral level are:

$$q_{GDP_{it}} = \alpha_{1j} + \beta_{1j} q_{jit} + \varepsilon_{jit} \qquad \text{(Equation I-A)}$$

$$q_{GDP_{it}} = \alpha_{2j} + \beta_{2j} \left(q_{jit} - q_{njit}\right) + \varepsilon_{jit} \qquad \text{(Equation I-B)}$$

$$q_{njit} = \alpha_{3j} + \beta_{3j} q_{jit} + \varepsilon_{jit} \qquad \text{(Equation I-C)}$$

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

The second law states that the faster the growth of manufacturing output (q_m), the faster will be the growth of productivity in manufacturing (p_m) as a result of increasing returns to scale (IRS). This first mechanism, explaining causality from manufacturing growth to GDP per worker growth, is known as Verdoorn's Law.[6] This law can be interpreted from the perspective of employment growth in manufacturing (e_m): the higher the scale economies of the sector, the lower the employment elasticity with respect to output, since productivity increases as a result of output expansion. This means that output expansion induces a less than proportional employment creation that causes productivity gains.

Kaldor (1966) specified the Verdoorn relation in terms of a linear regression model: $e_m = \beta_0 + \beta_1 q_m$ with $\beta_1 > 0$, where β_1 is an indicator of IRS (the Verdoorn coefficient). However, due to the productivity identity, this can be expressed as: $e_m = -\beta_0 + (1 - \beta_1) q_m$, with $0 < \beta_1 < 1$, where $(1 - \beta_1)$ is the elasticity of employment with respect to output growth. Then, the specification of Kaldor's Second Law can be expressed by:

$$e_{jit} = \alpha_{1j} + \beta_{1j} q_{jit} + \varepsilon_{jit} \qquad \text{(Equation II)}$$

where j, i, t stand for sector, country and time, respectively, and ε_{jit} is assumed to be normally distributed. e_{jit} is the sectoral employment growth and q_{jit} is the sectoral output growth.

6. Verdoorn's Law, named after the Dutch economist Petrus Johannes Verdoorn (1949), states that in the long run productivity generally grows proportionally to the square root of output. In economics, this law pertains to the relationship between the growth of output and the growth of productivity.

Finally, the third law states that a positive causal relationship exists between the expansion of the manufacturing sector and the growth of labour productivity outside of the manufacturing sector. This is explained by the presence of diminishing returns in agriculture and services, which supply labour to industry. This represents the second mechanism explaining causality from manufacturing to labour productivity growth. The reallocation of labour from agriculture to manufacturing releases surplus labour from the non-dynamic sectors of the economy and, as a result, overall productivity growth increases.

Most empirical studies focusing on developing economies (Dasgupta and Singh, 2005, 2006; Wells and Thirlwall, 2003) estimate this law by regressing overall productivity growth (p) on the growth of non-manufacturing employment (e_{nm}) and controlling for the growth of manufacturing output (q_m), which, according to Verdoorn's Law, induces productivity growth. Accordingly, the linear specification can be written as follows:

$$p = \beta_0 + \beta_1 e_{nm} + \beta_2 q_m, \text{ with } \beta_1 \langle 0;\ \beta_2 \rangle\, 0 \quad \text{(Equation III)}$$

Table 1 reviews and summarizes a number of KGL-related works for developing economies and classifies them on the basis of their country sample (N), their time horizon (T), the equations estimated in the empirical exercise and the level of sectoral disaggregation adopted. As mentioned in the introductory section, only a few studies have drawn attention to the (aggregate) services sector in their estimations. A notable exception is Pieper (2003) who examines Verdoorn's Law (Kaldor's Second Law) across 30 developing countries covering nine sectors.

DATA AND METHODOLOGY

The main sources of data used here are the Groningen Growth and Development Centre (GGDC) 10-Sector Database (Timmer and de Vries, 2007) and the Africa Sector Database (de Vries et al., 2013). These are the first databases that provide long-term series of value added (in current and constant prices) and employment for developing economies. On the one hand, these sources compute employment levels using population census information that tends to have a more complete coverage of informality (McMillan et al., 2014). This is particularly relevant in the analysis of developing countries. On the other hand, value-added information is gathered within the framework of the System of National Accounts, which makes the coverage of the informal sector by value added data vary across countries and depend on the quality of the national sources.

With regard to the time span, 1975 was chosen as a starting point because of data availability for all countries in the sample. Moreover, following Pieper (2003) and León-Ledesma (2000), we use a moving average of value added (at constant prices), employment and productivity growth rates (taking

Table 1. KGL in Developing Economies: A Summary of the Literature

Article	N	T	Equations estimated: 1st law	Equations estimated: 2nd law (Verdoorn's law)	Equations estimated: 3rd law	Estimations for aggregated sectors (agriculture, manufacturing, services)?	Estimations for disaggregated services?
Felipe (1998)	5 Asian countries	1967–1992	$q_{nm} = a_2 + b_2(q_m) + \varepsilon_2$	N.E.	N.E.	No	No
Pieper (2003)	30 developing countries	1970–1990	N.E.	$e_m = a_1 + b_1(q_m) + \varepsilon_1$	N.E.	Yes	Yes
Wells and Thirlwall (2003)	45 African countries	1980–1996	$q_{GDP} = a_1 + b_1(q_m) + \varepsilon_1$ $q_{GDP} = a_2 + b_2(q_m - q_{nm}) + \varepsilon_2$ $q_{nm} = a_3 + b_3(q_m) + \varepsilon_3$	$e_m = a_1 + b_1(q_m) + \varepsilon_1$	$p = a_1 + b_1(q_m) + c_1(e_{nm}) + \varepsilon_1$	Yes	No
Cimoli et al. (2005)	5 Latin American countries	1970–2000	N.E.	$e_m = a_1 + b_1(q_m) + \varepsilon_1$	N.E.	No	No
Dasgupta and Singh (2005)	30 developing countries	1980, 1990, 2000	$log q_{GDP} = a_1 + b_1(log q_m) + \varepsilon_1$	$log(p) = a_1 + b_1(log q_m) + c1(log e_{nm}) + \varepsilon_1$		Yes	No
Dasgupta and Singh (2006)	48 developing countries	1990–2000	$q_{GDP} = a_1 + b_1(q_m) + \varepsilon_1$	$p = a_1 + b_1(q_m) + c_1(e_{nm}) + \varepsilon_1$		Yes	No
Libanio and Moro (2006)	7 Latin American countries	1985–2001	$q_{GDP} = a_1 + b_1(q_m) + \varepsilon_1$ $q_{GDP} = a_2 + b_2(q_m - q_{nm}) + \varepsilon_2$ $q_{nm} = a_3 + b_3(q_m) + \varepsilon_3$	$e_m = a_1 + b_1(q_m) + c_1(k_m) + \varepsilon_1$	N.E.	No	No
Felipe et al. (2009)	17 Asian countries	1980–2004	$ln q_{nm} = a_3 + b_3(ln q_m) + \varepsilon_3$	$ln e_m = a_1 + b_1(ln q_m) + \varepsilon_1$	Decomposition of labour productivity growth	Yes	No
Pacheco and Thirlwall (2014)	89 developing countries	1990–2011	$q_{GDP} = a_1 + b_1(q_{EXP}) + \varepsilon_1$ $q_{EXP} = a_2 + b_2(q_m) + \varepsilon_2$ $q_{GDP} = a_1 + a_2 b_1 + b_1 b_2(q_m) + \varepsilon_2$	N.E.	N.E.	No	No

Note: N.E. = not estimated.
Source: Authors' own elaboration.

Table 2. Description of Sectoral Composition of GGDC Database

j	ISIC Rev. 3.1 code	Sector name	ISIC Rev. 3.1 description
1	A-B	Agriculture	Agriculture, Hunting and Forestry; Fishing
2	D	Manufacturing	Manufacturing
3	G-P	Services	Trade services; Transport services; Business services; Public services
4	G-H	Trade services	Wholesale and Retail trade; Repair of motor vehicles, motorcycles and personal and household goods; Hotels and Restaurants
5	I	Transport services	Transport, Storage and Communications
6	J-K	Business services	Financial Intermediation; Renting and Business activities (excluding owner-occupied rents)
7	L-P	Public services	Public Administration and Defence; Education, Health and Social work; Other Community, Social and Personal service activities; Activities of Private Households

Note: Following McMillan and Rodrik (2011) and McMillan et al. (2014), we aggregate value added and employment data for the 'government services' sector (L-N) and the 'personal services' sector (O-P) into a single 'public services' sector.
Source: GGDC 10-sector database.

five-year period averages) to smooth out short-term fluctuations present in the annual data ($T = 6$). As detailed in Table 2, available time series allow us to disentangle the different roles played by the three main aggregated sectors ($j = 1$, 2 and 3) and a range of service subsectors ($j = 4$, 5, 6 and 7). Therefore, the analysis is performed for seven different activities, namely: 1) agriculture; 2) manufacturing; 3) services; 4) trade services; 5) transport services; 6) business services; and 7) public services.

The empirical strategy followed in this research is twofold. First, we use panel data analysis to estimate Kaldor's First and Second Laws (Equations I-A, I-B, I-C and II). Regressions are performed by sector panel, both for the whole sample of 29 developing countries, and also for the three different regions. These include nine countries from Latin America, nine countries from Asia and 11 countries from Africa.[7] Accordingly, in the overall econometric analysis, every sector panel ends up having 174 observations based on five-year growth rates. When dealing with the three regional subsamples individually, every sector panel for the Asian and Latin American countries included in the sample presents 54 observations ($N = 9$ and $T = 6$). For the sub-Saharan African economies, each sector panel includes 66 observations ($N = 11$ and $T = 6$). Outliers are detected and treated using one dummy variable for each. Fixed country effects are added to deal with omitted

7. Latin American countries (N = 9): Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru and Venezuela; Asian countries (N = 9): Hong Kong (China), India, Indonesia, Rep. of Korea, Malaysia, Philippines, Singapore, Taiwan and Thailand; African countries (N = 11): Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania and Zambia.

heterogeneity. Equations are estimated by Ordinary Least Squares (OLS) with Panel Corrected Standard Error Estimations (PCSE) accounting for group-wise heteroscedasticity, cross-sectional dependence and autocorrelation in disturbances within panels.

Second, growth accounting can be a useful approach for analysing the relationships underlying Kaldor's Third Law, in order to overcome the matter of spurious correlation and identification problems present in Equation III. Accordingly, following Felipe et al. (2009) and McMillan and Rodrik (2011), we perform a conventional, shift-share decomposition analysis that allows us to decompose aggregate productivity growth in terms of (within sectors) differential growth of labour productivity and the reallocation of labour between industries (see Syrquin, 1984, for an overview).

The use of this conventional shift-share decomposition technique requires an explanation (Timmer and Szirmai, 2000). First of all, the shift-share analysis is supply-side oriented and assesses the effects of structural change on productivity growth. Changes in demand are taken as exogenously determined. What the shift-share shows is that the shifts in inputs that have taken place, whether or not driven by developments on the demand side, are (or are not) important in quantitative terms for aggregate productivity growth. This technique is based on several assumptions. The violation of any of these assumptions might result in an under- or over-estimation of the contribution of structural change to productivity growth. The problematic assumptions involve the aggregate level of the analysis, the assumption of marginal productivity equal to average productivity, the assumption of input homogeneity, the incidence of spillovers and the causal links between growth of output and productivity.

The decomposition was pioneered by Fabricant (1942) but later users of this method focused more on the labour productivity. Let π denote the labour productivity level, subscript j denotes sectoral branches ($j = 1, \ldots, n$, with n the number of branches), s_j is the share of branch j in total employment and superscripts 0 and T are the beginning and end of the period (0, T). Formally, the decomposition analysis is written as follows:

$$\begin{aligned}\dot{\pi} &= \frac{\pi_T - \pi_0}{\pi_0} \\ &= \frac{\sum_{j=1}^{N} \pi_{j0}\left(s_{jT} - s_{j0}\right)}{\pi_0} + \frac{\sum_{j=1}^{N} \left(\pi_{jT} - \pi_{j0}\right)\left(s_{jT} - s_{j0}\right)}{\pi_0} \\ &\quad + \frac{\sum_{j=1}^{N} s_{j0}\left(\pi_{jT} - \pi_{j0}\right)}{\pi_0} \qquad \text{(Equation IV)} \\ \dot{\pi} &= SSE + DSE + ISE = SCE + ISE\end{aligned}$$

According to Equation IV, aggregate productivity growth can be decomposed into intra-sectoral productivity growth (ISE, the last term on the right-hand side) and the effects of structural change (SCE) which consist of a static shift effect (SSE, the first term) and a dynamic shift effect (DSE, the second term). While the static effect measures productivity growth caused by a shift of labour towards sectors with a higher labour productivity level at the beginning of the period, the dynamic effect captures shifts towards more dynamic sectors, namely those with higher labour productivity growth rates. This interaction effect arises because of the use of a discrete fixed weight decomposition. We retain this term because it can provide an interesting economic interpretation for our analysis. As sectors differ not only in terms of productivity levels, but also in terms of productivity growth rates, resource reallocation has both static and dynamic effects and a distinction between the two is relevant.

The empirical analysis tackles two hypotheses related to structural effects. First, the *structural bonus hypothesis* postulates a positive relationship between structural change and economic growth as economies upgrade from low to higher productivity industries (SCE > 0). Secondly, the DSE can be used to test the *structural burden hypothesis* (DSE < 0). This hypothesis states that as labour reallocates into sectors with (generally) lower productivity growth, productivity growth of the economy will decline. This hypothesis is related to the existence (or not) of IRS within the sectors under consideration. If DSE > 0, IRS exist (industries which absorb more resources are those with increasing productivity levels). These results complement to some extent those obtained from the estimation of the second KGL.

FINDINGS

Kaldor's First Law

Panel data estimations for the whole sample of developing economies are shown in Table 3. In every sector under analysis the estimated coefficients are significant and follow the expected sign in Equation I-A and I-C. However, when Equation I-B is estimated, the regression coefficient is significant but negative in both agriculture and public services. In fact, only two sectors fulfil Equation I-B: manufacturing and business services. Consequently, like Dasgupta and Singh (2005, 2006), we confirm Kaldor's First Law across developing countries: manufacturing is an engine of output growth. Our results also show that one of the service subsectors, namely business services, seems to behave in a similar way. This sector embraces a set of different activities including standardized, most likely low-skilled services (like real estate, cleaning or security) and customized human capital intensive services such as research and development, computer-related activities, consultancy, engineering, advertising, etc. Business services play an essential

Table 3. Panel Data Estimation of Kaldor's First Law: All Developing Countries

	EQUATION I-A		**EQUATION I-B**		**EQUATION I-C**	
SECTOR	α_{1j} **/ s.e.**	β_{1j} **/ s.e.**	α_{2j} **/ s.e.**	β_{2j} **/ s.e.**	α_{3j} **/ s.e.**	β_{3j} **/ s.e.**
j = manufacturing	0.0125*	0.4682***	0.0173	0.1461*	0.0160*	0.3626***
	0.0053	0.0249	0.0094	0.0612	0.0065	0.0329
	R2	0.781	R2	0.4687	R2	0.637
j = agriculture	0.0107	0.2371***	0.0170*	−0.3027***	0.0124	0.1343*
	0.0088	0.0531	0.0068	0.0477	0.0092	0.0601
	R2	0.516	R2	0.605	R2	0.522
j = services	0.0008	0.8411***	0.0161	−0.1328	0.0002	0.7170**
	0.0031	0.0346	0.0090	0.0769	0.0070	0.0682
	R2	0.895	R2	0.461	R2	0.664
j = trade	0.0101**	0.5414***	0.0158	0.0464	0.0122**	0.4671***
	0.0033	0.0412	0.0093	0.0573	0.0036	0.0458
	R2	0.785	R2	0.451	R2	0.705
j = transport and communications	0.0007	0.4264***	0.0150	0.0220	0.00001	0.3934***
	0.0059	0.0493	0.0095	0.0752	0.0062	0.0518
	R2	0.703	R2	0.448	R2	0.649
j = business services	0.0066	0.3373***	0.0137	0.1536***	0.0076	0.2694***
	0.0084	0.0263	0.0090	0.0415	0.0082	0.0237
	R2	0.727	R2	0.527	R2	0.653
j = public services	0.0094	0.3833***	0.0157*	−0.370***	0.0112	0.2650**
	0.0083	0.0844	0.0063	0.0455	0.0107	0.1012
	R2	0.515	R2	0.599	R2	0.420
N	174		174		174	

Notes: OLS estimations with fixed effects and PCSE accounting for groupwise heteroscedasticity, cross-sectional dependence and serial correlation. Dummy coefficients estimates are available upon request. Legend: s.e. for standard deviation; *p<0.05; **p<0.01; ***p<0.001.
Source: Authors' own elaboration.

role in the creation and diffusion of knowledge, new technologies and non-technological modes of innovation (Ciarli et al., 2012; Crespi et al., 2014; Gallouj and Savona, 2008; Guerrieri and Meliciani, 2005). Moreover, these activities have achieved productivity improvements that have outperformed those of the manufacturing sectors (Maroto and Cuadrado, 2009; Timmer and de Vries, 2007, 2009; United Nations, 2010). Therefore, our results may reflect changes in inter-industry linkages of developing economies as a result of the increased use of business services as intermediate catering for manufacturing demand for more specialized functions.

Kaldor's First Law is also confirmed in the three macro regions under analysis, as shown in Appendix A. Manufacturing satisfies Equation I-A as well as Equation I-B and I-C. This finding is in line with those of Wells and Thirlwall (2003) for 45 African economies, Libanio and Moro (2006) for seven Latin American economies, and Felipe et al. (2009) for 17 Asian countries. Moreover, no relationship between the expansion of agriculture and overall growth is found in Asia, whereas in Latin America and Africa estimates for Equation I-B are significant but negative, as in the total country sample. This result is also found for the case of public services in the three different macro regions.

Overall, business services have behaved similarly to manufacturing in Asia and Latin America, although no evidence is found across African economies. This may be related to the undersized manufacturing basis attained by this latter region, which hampers the development of many business-related services. Deindustrialization in Africa is characterized by a declining diversity and sophistication of the region's manufacturing sectors (McMillan et al., 2014; Page, 2011). Indeed, when the side test is performed relating overall growth to the excess of business services output growth (over the non-business services growth), the regression coefficient is significant and negative.

Kaldor's Second Law

Table 4 reports panel data estimations for Equation II and provides a one-tailed test hypothesis of constant returns to scale (CRS, $\beta_{1j} = 1$) and increasing returns to scale (IRS, $\beta_{1j} < 1$) at the sectoral level. All sectors, with the exception of agriculture and trade, show employment elasticities with respect to output growth that are significant. Moreover, in five out of seven sectors, we can reject the CRS hypothesis at the 5 per cent confidence interval for one-tailed tests. In those sectors, estimates of the employment elasticity with respect to output growth are significantly less than unity.

Kaldor's Second Law is therefore confirmed for the whole sample of developing economies: there are IRS in manufacturing activities. The estimated elasticity is close to 0.5, a result in line with the traditional estimates of this effect (Felipe et al., 2009). Besides, Table 4 shows lower employment elasticities (namely, a higher degree of induced productivity growth) in services sectors in comparison with manufacturing. Although surprising, this evidence of strong IRS in services is in line with Pieper (2003). In the linear specification of the law including country effects, the author finds that estimated employment elasticities are lower in the service subsectors in comparison with manufacturing. This finding is highly relevant, as it points out that: i) services may be subject to increasing returns, and ii) the same Kaldorian mechanisms which make manufacturing the engine of growth may also apply to service sectors. Unfortunately, we have found no further studies in the Kaldorian tradition to compare our results for disaggregated service subsectors across developing economies. There is still a substantial gap in the Kaldor–Verdoorn related literature with regard to the full understanding of the specific factors behind differences in the magnitude of returns to scale across sectors, countries and over time (Romero, 2016).

When fitting Equation II to the data on Asia and Africa, evidence of IRS in manufacturing is also found (Appendix B). This is in line with Felipe et al.

Table 4. Panel Data Estimation of Kaldor's Second Law: All Developing Countries

	EQUATION II			
SECTOR	**β_{0j} / (s.e.)**	**β_{1j} / (s.e.)**	**H_o: $\beta_{1j} = 1$ / p-value**	**H_o: $\beta_{1j} < 1$ / p-value**
j = manufacturing	−0.0096	0.5819***	Reject H_o	Retain H_o
	0.0115	0.0566	(0.0000)	(1.0000)
	R2	0.620		
j = agriculture	−0.0120	0.1278		
	0.0066	0.0748		
	R2	0.566		
j = services	0.0209***	0.2118***	Reject H_o	Retain H_o
	0.0054	0.0545		
	R2	0.342		
j = trade	0.0224***	0.0028	(0.0000)	(1.0000)
	0.0046	0.0564		
	R2	0.400		
j = transport and communications	0.0098	0.3803***	Reject H_o	Retain H_o
	0.0124	0.0728	(0.0000)	(1.0000)
	R2	0.4072		
j = business services	0.0231	0.3107***	Reject H_o	Retain H_o
	0.0141	0.0463	(0.0000)	(1.0000)
	R2	0.541		
j = public services	0.0195***	0.3470***	Reject H_o	Retain H_o
	0.0054	0.0858	(0.0000)	(1.0000)
	R2	0.385		
N	174			

Notes: OLS estimations with fixed effects and PCSE accounting for groupwise heteroscedasticity, cross-sectional dependence and serial correlation. Dummy coefficients estimates are available upon request. Legend: s.e. for standard deviation; *p<0.05; **p<0.01; ***p<0.001.
Source: Authors' own elaboration.

(2009) and Wells and Thirlwall (2003). In contrast with Libanio and Moro (2006), no relationship between employment growth and output growth in manufacturing is found in Latin America.[8] On the one hand, our results may be reflecting the increasing share in total world manufacturing output and the rapid technological upgrade of Asian manufacturers. Felipe et al. (2015) show that, in general, Asian countries have had larger manufacturing employment shares during 1970–2010 than their African or Latin American counterparts. Furthermore, during the past four decades, Asia has experienced faster capital deepening and higher Total Factor Productivity (TFP) growth than other developing economies, including Latin America (Jaumotte and Spatafora, 2007). At sectoral level, productivity growth in industry and in services was higher than in other regions and, within the manufacturing sector, there has been a shift towards more skill-intensive sectors with higher productivity levels and growth. As suggested by Felipe et al. (2009), manufacturing output in a number of Asian economies (for example, South Korea,

8. Libanio and Moro (2006) estimate Equation II but also controlling for the growth of capital.

Malaysia, Taiwan and Singapore) has shifted into more technology- and scale-intensive subsectors. This has been supported by strong institutional quality, trade openness, and financial sector development. Thus, notwithstanding the high heterogeneity within Asia, these facts helped to promote the catching up with advanced economies (Jaumotte and Spatafora, 2007).

On the other hand, technology- and knowledge-intensive industries have lost ground over the past decades in many Latin American countries, which have experienced a relative decline in productivity growth (Pagés, 2010), combined with a relatively large share of non-skilled intensive sectors within manufacturing (Jaumotte and Spatafora, 2007). The manufacturing output has largely shrunk, in favour of natural-resource processing industries such as coal, paper, petrol and tobacco (Cimoli et al., 2005). There is evidence that points to a strong shift towards processing industries related to commodities for highly competitive world markets (Cimoli and Katz, 2003), accompanied by domestic sources of technology change and productivity growth rapidly decreasing.

More importantly, our findings question the traditional role posed to services as unlikely drivers of productivity growth in developing economies. Following the aggregated picture, IRS are found in total services in both Asia and Africa. As in manufacturing, no relationship is found between employment growth and output growth in services for the Latin American economies. According to Wells and Thirlwall (2003), no economic meaning can be attached to this kind of result except that employment growth seems to be independent of output growth. It is important to point out that business services show IRS in both Asian and Latin American countries.[9] Similarly, Timmer and de Vries (2009) suggest that market services (including trade, financial, business services and communications) have been important contributors to growth and development in Asia and Latin America from 1950 to 2005. These authors find that productivity gains within manufacturing and market services are key drivers for growth.

The regression exercise on Kaldor's Second Law indicates the capability of sectors for generating induced productivity growth. As this is still the object of a number of empirical controversies — as will be discussed later on — the next section provides a direct measurement of the contributions of structural change to productivity growth by means of a dynamic shift-share analysis.

Kaldor's Third Law

The results of productivity growth decomposition accounting for Kaldor's Third Law are shown in Table 5, broken down into sectoral

9. In African countries, the CRS hypothesis cannot be rejected at the 5 per cent confidence level.

Table 5. Productivity Growth Decomposition 1975–2005: All Developing Countries

SECTOR	**Labour productivity growth**	**Structural Effect (SCE = SSE + DSE)**	**Static Structural Effect (SSE)**	**Dynamic Structural Effect (DSE)**	**Intra-sectoral Effect (ISE)**
TOTAL	0.680 (100%)	0.161 (23.7%)	0.435 (64.0%) =	−0.274 (−40.3%) =	0.519 (76.3%) =
Agriculture	(0.939)	−0.127	−0.062	−0.065	0.117
Manufacturing	(1.087)	0.005	0.019	−0.014	0.155
Other industry	(1.854)	−0.081	0.055	−0.136	0.150
Services	(0.280)	0.363	0.422	−0.059	0.097
Trade	(0.068)	0.129	0.171	−0.042	0.004
Transport and communications	(1.040)	0.039	0.027	0.012	0.051
Business services	(0.191)	0.127	0.149	−0.022	0.003
Public services	(0.374)	0.068	0.075	−0.007	0.038
Sectoral contributions to each effect (adding the TOTAL by columns)					
Agriculture		−78.9%	−14.3%	23.7%	22.5%
Manufacturing		3.1%	4.4%	5.1%	29.9%
Other industry		−50.3%	12.6%	49.6%	28.9%
Services		225.5%	97.0%	21.5%	18.7%
Subsectoral contributions to each effect (adding the SERVICES by columns)					
Trade		35.5%	40.5%	71.2%	4.1%
Transport and communications		10.7%	6.4%	−20.3%	52.6%
Business services		35.0%	35.3%	37.3%	3.1%
Public services		18.7%	17.8%	11.9%	39.2%

Notes: The percentage contribution of each effect to aggregate productivity growth appears between brackets. 'Other industry' includes: mining and extracting activities, construction and energy.
Source: Authors' own elaboration.

contributions.[10] In line with Equation IV, the sum of the structural effects (SCE = SSE + DSE) and the intra-sectoral productivity growth effect (ISE) is equal to the average growth rate of labour productivity in the corresponding aggregate (first cell). This is how the data sum up horizontally. Vertically, for each of the three components, the contributions of each sector also add up to the corresponding figure in the first line of each sub-table. As additional information, the number in brackets shows the average growth of labour productivity within individual sectors, and does not add up either in the horizontal or in the vertical dimensions. The figures allow us to identify whether there are any regular patterns of differential productivity growth across industries.

Results show that the moderate labour productivity growth (0.68 per cent) of developing countries in the period under analysis is largely explained by

10. The category 'Other Industry' (comprising mining and extracting activities, construction, and energy) is also included in this section in order to obtain valid results of shift-share technique.

the intra-sectoral effect (ISE). In particular, almost three quarters of the total productivity growth corresponds to such components while structural change (SCE) only accounts for 23.7 per cent. This finding is consistent with that shown by McMillan and Rodrik (2011) for a similar period (1990–2005). As is often the case in the relevant literature (see Maroto and Cuadrado, 2009, and Peneder, 2003, for a review), the structural components (SCE) seem to be generally dominated by the within-effects of productivity growth (ISE).

The results also show that the structural bonus hypothesis is rejected for agriculture (SCE $= -0.127$) and is scarcely supported for the manufacturing sector (0.005). However, it appears to play a more important role in services (SCE $= 0.363$). In particular, business services and trade account for more than 70 per cent of the structural effects within services. This suggests that labour has reallocated from primary activities into manufacturing and, mainly, services. Nevertheless, industries absorbing resources have lost dynamism during 1975–2005 as the structural burden emerges (DSE < 0) in both manufacturing and services — and particularly in trade.[11]

Figures from Table 5 hide significant differences across regions. Appendix C shows that Asia has the highest labour productivity growth during 1975–2005 (1.65 per cent) which is mostly explained by the intra-sectoral component (82.5 per cent). Moreover, the structural bonus (SCE > 0) is found in all sectors with the exception of agriculture. Productivity gains in services materialize through factor reallocation effects (SCE $= 0.617$) mainly because business services account for a large part of such structural bonus (40 per cent). The DSE is negative but rather small in comparison with the other regions under study, with dynamic productivity gains emerging from both manufacturing (0.009) and services industries (0.174). This means that Asian economies — especially Indonesia, Thailand and Taiwan — seem not to have reached the *structural burden* yet in these activities.

The situation in Latin America is quite the opposite. This group of countries shows an extremely poor productivity performance during the three decades analysed (0.008 per cent). Notably, this is the only developing region in which static productivity losses are observed in manufacturing. The intra-sectoral productivity growth only accounts for one quarter while structural effects account for the other three quarters. The structural burden is comparatively important in the case of Latin America (with dynamic effects quantitatively similar to static effects), showing a negative DSE in all sectors under study. Finally, the African region follows, to a certain extent, the pattern found for the whole set of developing economies but with poorer

11. The size of the interaction effect will of course depend on the length of the period under consideration because it vanishes when the length approaches 0. Our results (see Table 5) are robust to the various ways in which the structural decomposition formula can be applied. Showing annual data instead of using data at the beginning and at the end of a year over a given period (as shown in Table 5) gives quite similar results.

developments. Labour productivity growth (0.40 per cent) is mostly explained by the ISE component (54.5 per cent).

Overall, we find that both manufacturing and services, mainly business services, show structural productivity gains for the whole set of developing countries. However, the quantitative gains of the structural bonus differ across regions. In Asia, the structural effects are quantitatively larger (0.289) than is the case for poor-performing Latin America (0.006) or Africa (0.184). Additionally, Asia shows increasing returns to scale both in manufacturing and business services (in the same way we observed in the results shown in Table 4 for the overall sample) as the DSE is positive for the whole period. In contrast, Latin America and Africa show negative DSE — both in manufacturing and in most service branches.

In this respect, McMillan and Rodrik (2011) point out that Asian countries have experienced growth-enhancing structural change during 1990–2005, whereas in Africa and Latin America, growth-reducing structural change has prevailed. This indicates that labour has shifted from high-productivity sectors (namely, manufacturing) to less productive activities (for example, personal services, informality or even unemployment).[12] Both low-income countries of sub-Saharan Africa and middle-income economies of Latin America have been intensely hit by deindustrialization, while Asian regions have been insulated from this trend (Rodrik, 2016). This kind of 'wrong' structural transformation is suggested to be related to the presence of large endowments of natural resources (which do not generate much employment, unlike manufacturing industries and business-related services); the overvaluation of currencies (which have a negative effect on tradable modern sectors); and the reduced flexibility of labour markets (which hampers the flow of labour across firms and sectors).

CONCLUDING REMARKS

This article has contributed to a recently revived debate around the threat of premature deindustrialization in emerging economies, originally put forward by Dasgupta and Singh (2005, 2006) and Palma (2005), and recently reprised by Bah (2011), Felipe and Mehta (2016), and Rodrik (2016). Concerns around deindustrialization are consistent with the narrative, present in academic and policy circles, of 'industrial policy is back',[13] that

12. Recently, McMillan et al. (2014) decomposed their results for the period 1990–2000 and 2000 onwards, and found that structural change has been growth-enhancing for Africa in the latter period, as a result of small expansions in different manufacturing subsectors.
13. See the recent Juncker Plan in Europe, the Made in China 2025 programme, the Indian National Manufacturing Policy, and new industrial strategy policies around the globe; see also Stiglitz (2016).

suggests a move back to active industrial policies to support the resurgence of manufacturing sectors.

We have argued that within this context it is important to qualify and give empirical content to the effects of premature deindustrialization, not least to properly ground industrial policies in developing countries. We therefore identified a few empirical stylized facts on the contribution of a set of different service branches — and the manufacturing and primary sectors — to aggregate growth and productivity performance in 29 developing countries over the past decades. To do so, we reprised the classical Kaldorian framework and devised an original empirical strategy, which included estimations of the Kaldor-Verdoorn Laws, complemented by a shift-share analysis.

Our findings suggest that the manufacturing sector has indeed been an engine of growth during the past three decades across Asian, Latin American and African countries, as the KGL remain valid for developing economies. More importantly, the evidence suggests that within the heterogeneous service sector, business services represent an additional engine of growth, as they contribute to aggregate productivity by means of the same Kaldorian mechanisms traditionally at work in manufacturing industries.

Indeed, much of the attention devoted by the literature to business services, and knowledge-intensive services in particular, has focused on their capacity to embody, process, accumulate and disseminate both codified and tacit information and knowledge to other firms and sectors. Such a role is grounded in their high share of skilled human capital, their contribution to learning processes and knowledge accumulation, and their role as co-producers of innovation (Gallego and Maroto, 2015) — for example, by facilitating knowledge transfer coming from foreign firms locating in developing countries. Additionally, an important number of technology-intensive manufacturing sectors represent a pool of demand for these knowledge-based business services (Guerrieri and Meliciani, 2005), which points to the importance of (forward and backward) inter-industry linkages between business services and the manufacturing sector, and to their use of knowledge and technology (Ciarli et al., 2012; López-Gonzalez et al., 2015; Meliciani and Savona, 2015). In this respect, a core manufacturing sector may be critical for growth not only per se, but also as it is able to promote the emergence of backward- and forward-linked sectors that Hirschman (1958) would label as 'high development' inducive (López-Gonzalez et al., 2015), with business services fitting this category.

In the developing world, Asia emerges as the only macro region where both manufacturing and business services consistently and systematically behave as dynamic sectors in the Kaldorian sense. This might be due to the emergence and diffusion of Global Value Chains (GVCs) across countries that had previously exhibited lower productivity and are now catching up, mostly in Asia (Felipe and Mehta, 2016). The region's specialization in export-oriented manufacturing with strong inter-industry linkages allows for the development of high-tech business service sectors which stimulate productivity and growth. The increased tradability of (manufacturing-linked) business services within GVCs have turned these activities into major players in the current wave of the globalization process (Gallego et al., 2013), opening up new opportunities for growth in developing economies (Gereffi and Fernandez-Stark, 2010a, 2010b; Hernández et al., 2014; López-Gonzalez et al., 2015). In support of this evidence, some modern tradable services (such as IT-related services) have notably expanded in Asian countries (for example, India and Philippines) and, as argued by Dasgupta and Singh (2005), may also lead to the expansion of manufacturing, rather than the other way around.

Conversely, and as we anticipated, we have found empirical support to the argument put forward by McMillan and Rodrik (2011), McMillan et al. (2014) and Rodrik (2016), namely, that a shift to low-tech, personal and informal services as a result of a loss of industrial core might instead lead to a Kaldorian-like productivity and growth slowdown. In particular, Latin America and Africa have overall followed a different path of structural change and growth. As argued by Dasgupta and Singh (2006), a pathological kind of deindustrialization has occurred within both regions during the 1980s and the 1990s, as many countries specialized according to their static comparative advantage — namely in resource-based industries, simple processing and/or labour-intensive products with little prospect for upgrade (Shafeaeddin, 2005). Long-run dynamic comparative advantages — that require the creation and diffusion of technological capabilities and innovations, and depend on strong linkages between firms and knowledge flows (Ocampo, 2005) — were instead disregarded. In particular, our results show that neither static nor dynamic productivity gains in manufacturing have been achieved in the case of Latin America. The deindustrialization experienced in this area has most likely hampered the emergence and development of advanced business-related services (Di Meglio, 2017) and might currently represent a case of 'specialization trap'.

Overall, our findings show that the debate around 'premature deindustrialization' in developing countries can be put in perspective, as the within- and across-sector productivity performance of services is very heterogeneous. What can be inferred by the wealth of results discussed above is that there are different types of deindustrialization, not all of which represent a structural burden for (developing) economies. For example, business services might support structural transformation of core manufacturing bases, as their productivity performances show similar dynamics across several macro areas of the world. Our findings show that the most dynamic sectors remain manufacturing and those that are tightly linked to it, such as business services. However, they also highlight that what matters, beyond sectoral boundaries, is the ability to create value added, which is not necessarily linked to a critical mass of manufacturing, rather to its potential for technological upgrading, knowledge accumulation and increased tradability.

The challenge for development policy is to induce and facilitate processes of structural transformation based on sectoral and technological upgrading, which might lead to a 'qualified' premature deindustrialization. Although the data at our disposal do not empirically support this, we might still claim that it is not the 'premature' nature of deindustrialization that might represent a concern, but the 'direction' of it.

Directions for a Research Agenda

A number of conceptual, methodological and empirical issues around the topic of premature deindustrialization remain at stake. Below, we identify areas for a research agenda on services in developing countries, which might build upon the findings of this manuscript.

When the Kaldorian framework emerged, there was more of a clear-cut distinction among sectors in an economy. At present, the distinction between many service and manufacturing industries is more debatable since their boundaries have become blurred over time, and the manufacturing–service interface has evolved, which makes the traditional sectoral classification unsustainable (Daniels and Bryson, 2002). Future research should focus on sectoral structural change from the perspective of the historical and geographical processes of knowledge dynamics (see among others, Ciarli et al., 2012) that have occurred in developing countries. Relatedly, it would be important to go into greater depth, at the micro-economic level, and look at the extent of the co-production relationship across service and other sectors' firms (Gallego and Maroto, 2015; Savona and Steinmueller, 2013).

A few methodological and empirical issues still need to be addressed and offer a promising future research agenda. First, the estimation of KGL remains an econometric challenge. There is room for further improvements on the use of additional variables, dynamic and non-linear techniques. In particular, more work is needed to reconcile all the specifications of Verdoorn's Law (Romero, 2016). Indeed, an extensive debate in the literature has focused on the fact that the specification used by Kaldor does not control for the contribution of growth of capital stock. Second, assuming, as Kaldor did, that the KLG is based on a technical progress function, excluding this variable from estimations is likely to provide a biased coefficient of returns to scale, except if a constant capital/output ratio is assumed (McCombie, 1982). However, in the case of developing economies, it is difficult to find reliable and consistent data of capital stocks at the sectoral level, as also noted by Jaumotte and Spatafora (2007) and Wells and Thirlwall (2003). Lack of data makes it difficult to account for capital stock growth in the estimation of Kaldor's Second Growth Law and severely limits international total factor productivity comparisons.

A further issue related to the econometric estimation of Verdoorn's Law is the possibility of simultaneous equation bias due to the potential endogeneity of the regressors. To overcome this, a variety of econometric techniques have been applied: simultaneous equation, instrumental variables and Granger causality tests. More recently, Felipe et al. (2009) propose using a semi-parametric technique. However, as discussed in McCombie et al. (2002), these procedures still suffer from limitations and the controversy is not yet resolved.

The diffusion of technical progress poses an additional challenge in the empirical estimation of Verdoorn's Law. If the former varies across countries, manufacturing productivity increases in 'laggard' countries may reflect the transfer of technology from leading countries, rather than indigenous innovation leading to domestic increasing returns of scale. To overcome this issue, the Verdoorn-related literature suggests the use of additional variables to account for the level of technological development and of cross-regional data. However, currently available data still do not allow such a strategy to be undertaken.

The Kaldorian framework relies on traditional productivity indicators. However, the accurate measurement of productivity in services is still an unresolved matter (Djellal and Gallouj, 2008; see also Grassano and Savona, 2014, for a review). As summarized in Maroto and Rubalcaba (2008) and in Di Meglio (2013), measuring output and input in services has hardly advanced since Griliches (1992). This is a well-known issue, particularly with regard to public services, where the measurement of productivity remains inadequate and flawed by data deficiency (Di Meglio et al., 2015). Data collection and empirical evidence should be preceded in this case by a substantial theoretical effort.

APPENDIX A

Table A. Panel Data Estimation of Kaldor's First Law

Table A.1. Asia

	EQUATION I-A		EQUATION I-B		EQUATION I-C	
SECTOR (*j*)	α_{1j}/s.e.	β_{1j}/s.e.	α_{2j}/s.e.	β_{2j}/s.e.	α_{3j}/s.e.	β_{3j}/s.e.
Manufacturing	0.0276***	0.4626***	0.0710**	0.2400*	0.0537***	0.3617***
	0.0039	0.0523	0.00611	0.1007	0.0043	0.0590
	R2	0.715	R2	0.292	R2	0.520
Agriculture	0.0712***	0.1622*	0.0431*	−0.1708	0.0719***	0.162
	0.0080	0.0805	0.0166	0.1019	0.0080	0.0848
	R2	0.357	R2	0.285	R2	0.305
Services	0.0021	0.9223***	0.0683	−0.244	−0.0036	0.9095***
	0.0038	0.0416	0.00	0.1358	0.0137	0.0864
	R2	0.920	R2	0.245	R2	0.747
Trade	0.012*	0.6755***	0.0570***	0.3763	0.0134	0.6102***
	0.0056	0.0444	0.009	0.209	0.00762	0.0551
	R2	0.859	R2	0.351	R2	0.784

(Continued)

Table A.1. Asia (continued)

	EQUATION I-A		EQUATION I-B		EQUATION I-C	
SECTOR (*j*)	α_{1j}/s.e.	β_{1j}/s.e.	α_{2j}/s.e.	β_{2j}/s.e.	α_{3j}/s.e.	β_{3j}/s.e.
Transport and communications	0.019*	0.548***	0.0610***	−0.2399**	0.02143*	0.5108***
	0.0077	0.0977	0.0054		0.0084	0.107
	R2	0.623	R2	0.352	R2	0.571
Business services	0.0404***	0.3097***	0.058***	0.2999***	0.0408***	0.2578***
	0.0051	0.0267	0.0070	0.04819	0.0064	0.0274
	R2	0.750	R2	0.521	R2	0.649
Public services	0.0362*	0.5048**	−0.5147***	−0.5147***	0.044*	0.397
	0.0150	0.1929	0.1132	0.1132	0.01876	0.2341
	R2	0.362	R2	0.504	R2	0.277
N	54		54		54	

Source: Authors' own elaboration.

Table A.2. Latin America

	EQUATION I-A		EQUATION I-B		EQUATION I-C	
SECTOR (*j*)	α_{1j}/s.e.	β_{1j}/s.e.	α_{2j}/s.e.	β_{2j}/s.e.	α_{3j}/s.e.	β_{3j}/s.e.
Manufacturing	0.0114**	0.6353***	0.020*	0.3848***	0.0148***	0.5564***
	0.0043	0.0551	0.0097	0.1323	0.0054	0.0653
	R2	0.823	R2	0.422	R2	0.723
Agriculture	0.0031	0.612***	0.0190***	−0.6878***	−0.0014	0.821***
	0.0090	0.2121	0.0051	0.0857	0.0089	0.196
	R2	0.323	R2	0.659	R2	0.438
Services	−0.0002	0.8998***	0.0156	−0.0420	−0.0006	0.7681***
	0.00288	0.0454	0.0083	0.1583	0.00690	0.0918
	R2	0.916	R2	0.217	R2	0.6538
Trade	0.0101**	0.5420***	0.01674*	0.1860	0.01245**	0.4503***
	0.0033	0.0585	0.00833	0.1124	0.0038	0.0700
	R2	0.720	R2	0.239	R2	0.571
Transport and communications	−0.0062	0.6304***	0.01247	0.1466	−0.0004	0.6007***
	0.0046	0.0509	0.0098	0.1278	0.0034	0.0637
	R2	0.796	R2	0.207	R2	0.756
Business services	0.0068	0.3292***	0.0137	0.1277*	0.0088	0.2349***
	0.0083	0.0452	0.0083	0.0561	0.0085	0.0479
	R2	0.588	R2	0.381	R2	0.4017
Public services	0.0055	0.6264***	0.0157**	−0.5235***	0.0069	0.5352***
	0.0076	0.1192	0.0051	0.0758	0.0101	0.1517
	R2	0.476	R2	0.522	R2	0.358
N	54		54		54	

Source: Authors' own elaboration.

Table A.3. Africa

SECTOR (j)	EQUATION I-A α_{1j}/s.e.	β_{1j}/s.e.	EQUATION I-B α_{2j}/s.e.	β_{2j}/s.e.	EQUATION I-C α_{3j}/s.e.	β_{3j}/s.e.
Manufacturing	0.0435^{***}	0.327^{***}	0.0571^{***}	0.1364^{*}	0.0479^{***}	0.2583^{***}
	0.00798	0.0547	0.00992	0.06506	0.0084	0.0567
	R2	0.626	R2	0.586	R2	0.575
Agriculture	0.06175^{***}	0.2370^{***}	0.0553	-0.150^{***}	0.0658^{***}	0.0103
	0.0105	0.0636	0.01314	0.0575	0.0124	0.0612
	R2	0.515	R2	0.397	R2	0.495
Services	0.0041	0.7074^{***}	0.04936^{***}	-0.2532^{***}	0.0098	0.4857^{**}
	0.0107	0.0818	0.0038	0.0769	0.0166	0.1291
	R2	0.729	R2	0.542	R2	0.437
Trade	0.0128^{*}	0.4545^{***}	0.0629^{***}	−0.00883	0.024728^{*}	0.3944^{***}
	0.0064664	0.0474	0.0110	0.0673	0.0126	0.0711
	R2	0.793	R2	0.412	R2	0.625
Transport and communications	0.0313^{**}	0.2993^{***}	0.0586	0.1035	0.0339^{**}	0.2641^{***}
	0.0093	0.0593	0.0111	0.09725	0.0098	0.0608
	R2	0.640	R2	0.431	R2	0.597
Business services	0.03506^{***}	0.4520^{***}	0.05445	-0.2164^{*}	0.03842^{***}	0.3959^{***}
	0.00991	0.0760	0.00725	0.1088	0.0108	0.0817
	R2	0.641	R2	0.558	R2	0.580
Public services	0.0429^{***}	0.2259^{**}	0.0582^{***}	-0.2625^{***}	0.0501	0.0907
	0.01063	0.0895	0.0083	0.0693	0.0126	0.1033
N	66		66		66	

Notes: OLS estimations with fixed effects and PCSE accounting for groupwise heteroscedasticity, cross-sectional dependence and serial correlation. Dummy coefficients estimates are available on request. Legend: s.e. for standard deviation; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.
Source: Own elaboration.

APPENDIX B

Table B. Panel Data Estimation of Kaldor's Second Law

Table B.1. Asia

SECTOR (j)	EQUATION II β_{0j}/(s.e.)	β_{1j}/(s.e.)	H_o: $\beta_{1j} = 1$ / p-value	H_o: $\beta_{1j} < 1$ / p-value
Manufacturing	-0.060^{***}	0.695^{***}	Reject H_o	Retain H_o
	0.0082	0.070	(0.0000)	(.99999159)
	R2	0.766		
Agriculture	-0.0307^{***}	0.461^{***}	Reject H_o	Retain H_o
	0.0103	0.1101	(0.0000)	(.9999995)
	R2	0.587		
Services	0.0252^{***}	0.283^{***}	Reject H_o	Retain H_o
	0.0065	0.0749	(0.0000)	(1.0000)
	R2	0.333		

(Continued)

Table B.1. Asia (continued)

	EQUATION II			
SECTOR (*j*)	**β_{0j}/(s.e.)**	**β_{1j}/(s.e.)**	**H_o: $\beta_{1j} = 1$ / p-value**	**H_o: $\beta_{1j} < 1$ / p-value**
Trade	0.03134***	0.1033		
	0.0083	0.1013		
	R2	0.091		
Transport and communications	0.0231	0.2626**	Reject H_o	Retain H_o
	0.0124	0.0984	(0.0000)	(1.0000)
	R2	0.377		
Business services	0.0554***	0.2414***	Reject H_o	Retain H_o
	0.0108	0.0491	(0.0000)	(1.0000)
	R2	0.419		
Public services	0.0319*	0.1968		
	0.0107	0.1168		
	R2	0.453		
N	54			

Source: Authors' own elaboration.

Table B.2. Latin America

	EQUATION II			
SECTOR (*j*)	**β_{0j} / (s.e.)**	**β_{1j} /(s.e.)**	**H_o: $\beta_{1j} = 1$ / p-value**	**H_o: $\beta_{1j} < 1$ / p-value**
Manufacturing	−0.0082	0.2992		
	0.0093	0.1964		
	R2	0.427		
Agriculture	−0.0073	−0.1025		
	0.0078	0.2102		
	R2	0.118		
Services	0.0245***	0.0033		
	0.0043	0.0930		
	R2	0.360		
Trade	0.0223	0.0185		
	0.0049	0.1037		
	R2	0.389		
Transport and communications	0.0161	0.1964		
	0.01348	0.1467		
	R2	0.075		
Business services	0.0261	0.1772*	Reject H_o	Retain H_o
	0.0151	0.0825	(0.0000)	(1.0000)
	R2	0.580		
Public services	0.0207***	0.2691		
	0.0056	0.1624		
	R2	0.315		
N	54			

Source: Authors' own elaboration.

Table B.3. Africa

SECTOR (j)	β_{0j}/(s.e.)	β_{1j}/(s.e.)	H_o: $\beta_{1j} = 1$/ p-value	H_o: $\beta_{1j} < 1$/ p-value
	EQUATION II			
Manufacturing	0.0301	0.718***	Reject H_o	Retain H_o
	0.0228	0.1158	(0.0152)	(.99242332)
	R2	0.613		
Agriculture	0.0116	−0.110**		
	0.0065	0.0400		
	R2	0.559		
Services	0.0281**	0.30794**	Reject H_o	Retain H_o
	0.0105	0.0949	(0.0000)	(1.0000)
	R2	0.378		
Trade	0.0805***	0.1104		
	0.0172	0.109		
	R2	0.305		
Transport and communications	−0.0182	0.666***	Reject H_o	Retain H_o
	0.0211	0.0907	(0.0000)	(.99988027)
	R2	0.556		
Business services	0.0143	0.8220***	Retain H_o	
	0.0120	0.1009	(0.0779)	
	R2	0.623		
Public services	0.0031	0.3958**	Reject H_o	Retain H_o
	0.0154	0.1180	(0.0000)	(.99999984)
	R2	0.438		
N	66			

Notes: OLS estimations with fixed effects and PCSE accounting for groupwise heteroscedasticity, cross-sectional dependence and serial correlation. Dummy coefficients estimates are available on request. Legend: s.e. for standard deviation; *p<0.05; **p<0.01; ***p<0.001.
Source: Authors' own elaboration.

APPENDIX C

Table C. Productivity Growth Decomposition: Per Cent Contribution of Each Effect

Table C.1. Asia

SECTOR	Labour productivity growth	Structural Effect (SCE = SSE + DSE)	Static Structural Effect (SSE)	Dynamic Structural Effect (DSE)	Intra-sectoral Effect (ISE)
TOTAL	1.655	0.289	0.479	−0.190	1.366
		(17.5%)	(28.9%)	(−11.5%)	(82.5%)
Agriculture	(1.338)	−0.223	−0.084	−0.139	0.225
Manufacturing	(2.917)	0.044	0.035	0.009	0.414
Other industry	(3.991)	−0.149	0.085	−0.234	0.290
Services	(1.027)	0.617	0.443	0.174	0.437
Trade	(0.992)	0.194	0.107	0.087	0.162

(Continued)

Table C.1. Asia (continued)

SECTOR	Labour productivity growth	Structural Effect (SCE = SSE + DSE)	Static Structural Effect (SSE)	Dynamic Structural Effect (DSE)	Intra-sectoral Effect (ISE)
Transport and communications	(2.039)	0.073	0.038	0.035	0.106
Business services	(0.758)	0.239	0.211	0.028	0.038
Public services	(0.849)	0.111	0.087	0.024	0.131
Sectoral contributions to each effect (adding the TOTAL by columns)					
Agriculture		−77.2	−17.5	73.2	16.5
Manufacturing		15.2	7.3	−4.7	30.3
Other industry		−51.6	17.7	123.2	21.2
Services		213.5	92.5	−91.6	32.0
Sub-sectoral contributions to each effect (adding the SERVICES by columns)					
Trade		31.4	24.2	50.0	37.1
Transport and communications		11.8	8.6	20.1	24.3
Business services		38.7	47.6	16.1	8.7
Public services		18.0	19.6	13.8	30.0

Source: Authors' own elaboration.

Table C.2. Latin America

SECTOR	Labour productivity growth	Structural Effect (SCE = SSE + DSE)	Static Structural Effect (SSE)	Dynamic Structural Effect (DSE)	Intra-sectoral Effect (ISE)
TOTAL	0.008	0.006 (75%)	0.338 (4225%)	−0.332 (−4150%)	0.002 (25%)
Agriculture	(1.180)	−0.085	−0.040	−0.045	0.085
Manufacturing	(0.226)	−0.057	−0.035	−0.022	0.046
Other industry	(0.585)	−0.035	0.025	−0.060	0.027
Services	(−0.310)	0.183	0.388	−0.205	−0.156
Trade	(−0.473)	0.072	0.167	−0.095	−0.089
Transport and communications	(0.414)	0.022	0.022	0.000	0.019
Business services	(−0.385)	0.065	0.163	−0.098	−0.033
Public services	(−0.219)	0.024	0.036	−0.012	−0.053
Sectoral contributions to each effect (adding the TOTAL by columns)					
Agriculture		−1416.7	−11.8	13.6	4250.0
Manufacturing		−950.0	−10.4	6.6	2300.0
Other industry		−583.3	7.4	18.1	1350.0
Services		3050.0	114.8	61.7	−7800.0
Sub-sectoral contributions to each effect (adding the SERVICES by columns)					
Trade		39.3	43.0	46.3	57.1
Transport and communications		12.0	5.7	0.0	−12.2
Business services		35.5	42.0	47.8	21.2
Public services		13.1	9.3	5.9	34.0

Source: Authors' own elaboration.

Table C.3. Africa

SECTOR	Labour productivity growth	Structural Effect (SCE = SSE + DSE)	Static Structural Effect (SSE)	Dynamic Structural Effect (DSE)	Intra-sectoral Effect (ISE)
TOTAL	0.407	0.184 (45.2%)	0.483 (118.7%)	−0.299 (−73.5%)	0.222 (54.5%)
Agriculture	(0.299)	−0.071	−0.061	−0.010	0.042
Manufacturing	(0.119)	0.027	0.057	−0.030	0.005
Other industry	(0.987)	−0.059	0.056	−0.115	0.166
Services	(0.122)	0.287	0.431	−0.144	0.009
Trade	(−0.315)	0.112	0.239	−0.119	−0.060
Transport and communications	(0.667)	0.023	0.021	0.002	0.029
Business services	(0.200)	0.080	0.074	0.006	0.005
Public services	(0.492)	0.064	0.097	−0.033	0.035
Sectoral contributions to each effect (adding the TOTAL by columns)					
Agriculture		−38.6	−12.6	3.3	18.9
Manufacturing		14.7	11.8	10.0	2.3
Other industry		−32.1	11.6	38.5	74.8
Services		156.0	89.2	48.2	4.1
Sub-sectoral contributions to each effect (adding the SERVICES by columns)					
Trade		39.0	53.6	82.6	−666.7
Transport and communications		8.0	4.9	−1.4	322.2
Business services		27.9	17.2	−4.2	55.6
Public services		22.3	22.5	22.9	388.9

Source: Authors' own elaboration.

REFERENCES

Bah, E. (2011) 'Structural Transformation Paths across Countries', *Emerging Markets Finance and Trade* 47(2): 5–19.

Ciarli, T. and M. Di Maio (2013) 'Theoretical Arguments for Industrialization-driven Growth and Economic Development'. SPRU Working Paper Series 2013-06. Brighton: University of Sussex.

Ciarli, T., V. Meliciani and M. Savona (2012) 'Knowledge Dynamics, Structural Change and the Geography of Business Services', *Journal of Economic Surveys* 26(3): 445–67.

Cimoli, M. and J. Katz (2003) 'Structural Reforms, Technological Gaps and Economic Development: A Latin American Perspective', *Industrial and Corporate Change* 12(2): 387–411.

Cimoli, M., G. Dosi and J.E. Stiglitz (2009) *Industrial Policy and Development: The Political Economy of Capabilities Accumulation*. New York: Oxford University Press.

Cimoli, M., G. Porcile, A. Primmi and S. Vergara (2005) 'Cambio Estructural, Heterogeneidad Productiva y Tecnología en América Latina' ['Structural Change, Structural Heterogeneity and Technology in Latin America'], in M. Cimoli (ed.) *Heterogeneidad Estructural, Asimetrías Tecnológicas y Crecimiento en América Latina* [*Structural Heterogeneity, Technological Asymmetries and Growth in Latin America*], pp. 9–39. Santiago de Chile: CEPAL, Naciones Unidas. http://mpra.ub.uni-muenchen.de/3832/ (accessed 4 April 2018).

Crespi, G., E. Tacsir and F. Vargas (2014) 'Innovation and Productivity in Services: Empirical Evidence from Latin America'. IADB Working Paper No. 6592. Washington, DC: Inter-American Development Bank.

Daniels, P.W. and J.R. Bryson (2002) 'Manufacturing Services or Servicing Manufacturing? New Forms of Production in Advanced Capitalist Economies', *Urban Studies* 39: 977–91.

Dasgupta, S. and A. Singh (2005) 'Will Services Be the New Engine of Indian Economic Growth?', *Development and Change* 36(6): 1035–58.

Dasgupta, S. and A. Singh (2006) 'Manufacturing, Services and Premature De-industrialization in Developing Countries: A Kaldorian Empirical Analysis'. CBR Working Paper No. 327. Cambridge: University of Cambridge.

Di Meglio, G. (2013) 'The Place of ServPPINs in the Range of Public–Private Collaboration Arrangements for Services Provision', in F. Gallouj, P. Windrum and L. Rubalcaba (eds) *Public–Private Innovation Networks in Services*, pp. 59–87. Cheltenham: Edward Elgar.

Di Meglio, G. (2017) 'Services and Growth in Developing Countries: A Kaldorian Analysis', in N. Beerepoot, B. Lambregts and J. Kleibert (eds) *Globalisation and Services-driven Economic Growth*, pp. 38–54. New York: Routledge.

Di Meglio, G., M. Stare, A. Maroto and L. Rubalcaba (2015) 'Public Services Performance: An Extended Framework and Empirical Assessment across the Enlarged EU', *Environment and Planning C: Government and Policy* 33(2): 321–41.

Dixon, R. and A.P. Thirlwall (1975) 'A Model of Regional Growth Rate Differences on Kaldorian Lines', *Oxford Economic Papers* 27: 201–14.

Djellal, F. and F. Gallouj (2008) *Measuring and Improving Productivity in Services: Issues, Strategies and Challenges*. Cheltenham: Edward Elgar.

Fabricant, S. (1942) *Employment in Manufacturing 1899–1939*. New York: National Bureau of Economic Research.

Felipe, J. (1998) 'The Role of the Manufacturing Sector in Southeast Asian Development: A Test of Kaldor's First Law', *Journal of Post Keynesian Economics* 20(3): 463–85.

Felipe, J. and A. Mehta (2016) 'Deindustrialization? A Global Perspective', *Economics Letters* 149: 148–51.

Felipe, J., A. Mehta and C. Rhee (2015) 'Manufacturing Matters, but it's the Jobs that Count'. ADB Economics Working Paper Series No. 420. Manila: Asian Development Bank. https://ssrn.com/abstract=2558904 (accessed 4 April 2018).

Felipe, J., M. León-Ledesma, M. Lanzafame and G. Estrada (2009) 'Sectoral Engines of Growth in Developing Asia: Stylised Facts and Implications', *Malaysian Journal of Economic Studies* 46(2): 107–33.

Gallego, J. and A. Maroto (2015) 'The Specialization in Knowledge-intensive Business Services (KIBS) across Europe: Permanent Co-localization to Debate', *Regional Studies* 49(4): 644–64.

Gallego, J., L. Rubalcaba and C. Hipp (2013) 'Services and Organizational Innovation: The Right Mix for Value Creation', *Management Decision* 51(6): 1117–34.

Gallouj, F. and M. Savona (2008) 'Innovation in Services: A Review of the Debate and a Research Agenda', *Journal of Evolutionary Economics* 19(2): 149–72.

Gereffi, G. and K. Fernandez-Stark (2010a) 'The Offshore Services Value Chains. Developing Countries and the Crisis'. WB Policy Research Working Papers No. 5262. Washington, DC: World Bank.

Gereffi, G. and K. Fernandez-Stark (2010b) 'The Offshore Services Value Chain'. Duke CGGC Research Paper. Durham, NC: Centre on Globalisation, Governance and Competitiveness, Duke University.

Grassano, N. and M. Savona (2014) 'Productivity in Services Twenty Years On. A Review of Conceptual and Measurement Issues and a Way Forward'. SPRU Working Paper No. 2014–01. Brighton: University of Sussex.

Griliches, Z. (1992) *Output Measurement in the Service Sector*. Chicago, IL: University of Chicago Press.

Guerrieri, P. and V. Meliciani (2005) 'Technology and International Competitiveness: The Interdependence between Manufacturing and Producer Services', *Structural Change and Economic Dynamics* 16(4): 489–502.

Hernández, R.A. et al. (2014) *Latin America's Emergence in Global Services. A New Driver of Structural Change in the Region?* Santiago de Chile: Economic Commission for Latin America and the Caribbean.

Hirschman, A.O. (1958) *The Strategy of Economic Development*. New Haven, CT: Yale University Press.

Jaumotte, F. and N. Spatafora (2007) 'Asia Rising: A Sectoral Perspective'. IMF Working Paper No. WP/07/130. Washington, DC: International Monetary Fund.

Kaldor, N. (1966) *Causes of the Slow Rate of Economic Growth of the United Kingdom*. Cambridge: Cambridge University Press.

Kaldor, N. (1967) *Strategic Factors in Economic Development*. Ithaca, NY: New York State School of Industrial and Labour Relations, Cornell University.

Kaldor, N. (1970) 'The Case for Regional Policies', *Scottish Journal of Political Economy* 17: 337–48.

León-Ledesma, M. (2000) 'Economic Growth and Verdoorn's Law in the Spanish Regions, 1962–91', *International Review of Applied Economics* 14(1): 55–69.

Lewis, W.A. (1954) 'Economic Development with Unlimited Supplies of Labour', *The Manchester School* 22: 139–91.

Libanio, G. and S. Moro (2006) 'Manufacturing Industry and Economic Growth in Latin America: A Kaldorian Approach'. Unpublished paper.

López-Gonzalez, J., V. Meliciani and M. Savona (2015) 'When Linder Meets Hirschman. Inter-industry Linkages and GVCs in Services'. SPRU Working Paper Series No. 2015–20. Brighton: University of Sussex.

Maroto, A. and J.R. Cuadrado (2009) 'Is Growth of Services an Obstacle to Productivity Growth? A Comparative Analysis', *Structural Change and Economic Dynamics* 20(4): 254–65.

Maroto, A. and L. Rubalcaba (2008) 'Services Productivity Revisited', *The Service Industries Journal* 28(3): 337–53.

Matsuyama, K. (2009) 'Structural Change in an Interdependent World: A Global View of Manufacturing Decline', *Journal of the European Economic Association* 7(2–3): 478–86.

McCombie, J.S.L. (1982) 'Economic Growth, Kaldor's Law and the Static-dynamic Verdoorn Law Paradox', *Applied Economics* 14: 279–94.

McCombie, J., M. Pugno and B. Soro (2002) *Productivity Growth and Economic Performance: Essays on Verdoorn's Law*. Basingstoke: Palgrave Macmillan.

McMillan, M. and D. Rodrik (2011) 'Globalization, Structural Change, and Productivity Growth'. NBER Working Paper No. 17143. Cambridge, MA: National Bureau of Economic Research.

McMillan, M., D. Rodrik and I. Verduzco-Gallo (2014) 'Globalization, Structural Change and Productivity Growth: With an Update on Africa', *World Development* 63: 11–32.

Meliciani, V. and M. Savona (2015) 'The Determinants of Regional Specialisation in Business Services. Agglomeration Economies, Vertical Linkages and Innovation', *The Journal of Economic Geography* 15: 387–416.

Ocampo, J.A. (2005) *Beyond Reforms: Structural Dynamics and Macroeconomic Vulnerability*. Palo Alto, CA: Stanford University Press; Washington, DC: World Bank.

Pacheco, P. and A.P. Thirlwall (2014) 'A New Interpretation of Kaldor's First Growth Law for Open Developing Economies', *Review of Keynesian Economics* 3(July): 384–98.

Page, J. (2011) 'Should Africa Industrialize?'. UNU-WIDER Research Paper No. 2011/47. Helsinki: World Institute for Development Economics Research.

Pagés, C. (2010) *The Age of Productivity: Transforming Economies from the Bottom Up*. Washington, DC: Inter-American Development Bank.

Palma, G. (2005) 'Four Sources of "De-industrialization" and a New Concept of the "Dutch Disease"', in J. Ocampo (ed.) *Beyond Reforms: Structural Dynamics and Macroeconomic Vulnerability*, pp. 71–116. Palo Alto, CA: Stanford University Press; Washington, DC: World Bank.

Peneder, M. (2003) 'Industrial Structure and Aggregate Growth', *Structural Change and Economic Dynamics* 14: 427–48.
Pieper, U. (2003) 'Sectoral Regularities of Productivity Growth in Developing Countries: A Kaldorian Interpretation', *Cambridge Journal of Economics* 27(6): 831–50.
Rodrik, D. (2016) 'Premature Deindustrialization', *Journal of Economic Growth* 21(1): 1–33.
Romero, J. (2016) 'Economic Growth from a Kaldorian Perspective: Theory, Evidence and Agenda', *Brazilian Keynesian Review* 2(2): 189–210.
Ros, J. (2000) *Development Theory and the Economics of Growth*. Ann Arbor, MI: The University of Michigan Press.
Savona, M. and W.E. Steinmueller (2013) 'Service Output, Innovation and Productivity: A Time-based Conceptual Framework', *Structural Change and Economic Dynamics* 27: 118–32.
Shafaeddin, S.M. (2005) 'Trade Liberalization and Economic Reform in Developing Countries: Structural Change or Deindustrialization?'. UNCTAD Discussion Papers 179. Geneva: UNCTAD.
Stiglitz, J.E. (2016) 'Industrial Policy, Learning, and Development'. UNU-WIDER Working Paper No. 2016. Helsinki: World Institute for Development Economics Research.
Stiglitz, J.E. and J.Y. Lin (2013) *The Industrial Policy Revolution I. The Role of Government beyond Ideology*. Basingstoke: Palgrave Macmillan.
Storm, S. (2015) 'Structural Change', *Development and Change* 46(4): 666–99.
Syrquin, M. (1984) 'Resource Allocation and Productivity Growth', in M. Syrquin, L. Taylor and L.E. Westphal (eds) *Economic Structure Performance — Essays in Honor of Hollis B. Chenery*, pp. 75–101. Orlando, FL and London: Academic Press.
Targetti, F. (2005) 'Nicholas Kaldor: Key Contributions to Development Economics', *Development and Change* 36(6): 1185–99.
Thirlwall, A.P. (1983) 'Symposium on Kaldor's Laws', *Journal of Post Keynesian Economics* 5(3): 341–44.
Thirlwall, A.P. (2013) *Economic Growth in an Open Developing Economy: The Role of Structure and Demand*. Cheltenham: Edward Elgar.
Timmer, M. and G. de Vries (2007) 'A Cross-country Database for Sectoral Employment and Productivity in Asia and Latin America, 1950–2005'. Research Memorandum GD-98. Groningen: University of Groningen.
Timmer, M. and G. de Vries (2009) 'Structural Change and Growth Accelerations in Asia and Latin America: A New Sectoral Data Set', *Cliometrica* 3(2): 165–90.
Timmer, M. and A. Szirmai (2000) 'Productivity Growth in Asian Manufacturing: The Structural Bonus Hypothesis Examined', *Structural Change and Economic Dynamics* 11(4): 371–92.
Tregenna, F. (2011) 'Manufacturing Productivity, Deindustrialization, and Reindustrialization'. UNU-WIDER Research Paper No. 2011/57. Helsinki: World Institute for Development Economics Research.
United Nations (2010) 'Structural Change and Employment Creation in Developing Countries', in *UN Trade and Development Report*, pp. 99–131. New York and Geneva: United Nations.
de Vries, K., R. Gouma, G.J. de Vries and M.P. Timmer (2013) 'The Africa Sector Database: Sources and Methods'. Groningen: Groningen Growth and Development Centre (mimeo).
Wells, H. and A.P. Thirlwall (2003) 'Testing Kaldor's Growth Laws across the Countries of Africa', *African Development Review* 15: 89–105.
Westkämper, E. (2014) *Towards the Re-Industrialization of Europe: A Concept for Manufacturing for 2030*. Berlin: Springer Verlag.

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