

**ECONOMIC DEVELOPMENT AND STRUCTURAL CHANGE:  
THE ROLE OF SERVICES**

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This work studies the structural transformation of the sectorial production shares along the development process, for a worldwide sample of both advanced and developing countries and for the different regions with the different that compose the total sample. The study is carried out for 39 countries during the 1960-2011 period. This explores the evolution of the structural transformation in the development process, and in particular the effect of the expansion of service sector on economic growth. First, it presents empirical evidence on an increasing share of industrial and mainly services sectors in the growth process, as for the worldwide sample as for different economic regions, and a hump-shaped relationship between industrial production and income. Then, this research points out that the higher participation of industry is favorable. In turn, except the business activities, services sector is harmful for economic growth, which confirms the intuition stated by Rodrik (2016).

*Keywords:* Structural Change, Level of Development, Economic Growth

*JEL Classification:* O10, O11, O14

## 1. INTRODUCTION

The structural transformation, defined as the reallocation of economic activity across three broad sectors (primary, secondary and tertiary) that accompanies the process of modern economic growth, was largely studied in the literature. One of the most important stylized facts of the development process in the last decades has been a sustained trend growth of the economies, associated with an increasing of the share of industrial and particularly the services sectors in the GDP. In fact, there have been many attempts to identify patterns of structural change during such process. Since the seminal papers of Kuznets (1957) and Chenery (1960), most of the early contributions were interested in the relationship between the agricultural and industrial sectors using cross-section and time-series data. Later, Syrquin and Chenery (1989), in a cross-country analysis, claim that there is sufficient uniformity within countries for the

main features of structural transformation to emerge as clear and consistent patterns of modern economic growth. In turn, higher income growth and more marked transformation are found among the groups of countries with large populations, a predominance of manufactures in exports, and a larger role of exports.

An approach of this issue has been focused on the role of exports diversification. Into this Imbs and Wacziarg (2003) and Klinger and Lederman (2011) claim that the relationship between this and economic growth presents an inverse U-shape. In the first period of economic development, the real GDP per capita increases along with the product exports diversification, but after a certain maximal level of income it is replaced by the concentration of exports. In terms of the impact on the economy at different stages of development, Gozgor and Muhlis (2016) observe a positive relationship between exports diversification and income level in countries with in low, lower middle and upper middle GDP per capita. Nevertheless, this relationship becomes negative in the high-income non-OECD- and OECD high income countries. In particular, exports concentration promotes the real GDP per capita. More recently, Bahar and Santos (2018), in a sample of commodity prices and data on the detection of new oil and gas reserves, observe that economies with a large share of natural resources in exports concentrate in fewer non-resource commodities the rest of their exports.

Nonetheless, the literature has paid particular attention to the prominent role of the service sector, which presents an increasing contribution in the economic activity (see the early works of Chenery and Taylor (1968) and Chenery and Syrquin (1975) in a cross-section and time-series studies, and Berry (1978) in a comparative analysis of the sector shares between developing and developed countries, among others). In turn, the empirical evidence presented in Fan et al. (2003), More recently, in the framework of a neoclassical model Liu and Yang (2015) state that the structural change has played a key role to explain the more accelerated growth of China in comparison to India during the last decades of the structural change. In particular, they find that the higher Chinese productivity growth in the manufacture and agriculture sectors explain accounts for most of the aggregate productivity growth gap between these countries.

Interestingly, the increasing role of the service sector was associated with a declination of the industry in the total GDP, which is known as a phenomenon of deindustrialization. In fact, Gemmell (1982) presents evidence on patterns of structural change during the development process, and in special on this phenomenon in many developed countries. Similarly, the research that was carried out from Chenery and Syrquin (1986) to Maddison (1991) and Herrendorf et al. (2013), among others, show for many countries that structural change involves three distinct patterns: a decline in agriculture, a rise in services, and a hump-shaped pattern in manufacturing labor shares at higher development levels. In the same sense, a recent investigation published by Rodrik (2016) shows a premature deindustrialization process given by a hump-shaped relationship between industrialization and income, particularly in the recent decades in the growth process of Latin American countries. Differently, Castillo and Neto (2016) define the deindustrialization process in the region as a decreasing share of

manufacturing employment and value added in total employment and GDP, respectively, and an increasing participation of primary products. In this framework, they find that the early deindustrialization in Argentina, Brazil and Peru was associated to specialization in commodities, manufactures based in resources and low productivity services. All in all, both papers seem to agree on a premature deindustrialization process in the region, which can be due to a higher participation of primary or services sectors in the GDP.

Previously, Syrquin (2007) finds an increasing share of trade, production and labor forces of the industrial and in special of the services sectors, and a decreasing participation in the agricultural production at higher income levels in a wide sample of countries. Also, Chen et al. (2011), in a study of the structural change in China during the 1948-2008 period, present evidence of a sustained increasing trend of the labor force composition in the secondary and tertiary sectors, as well as a dramatic reduction in the primary sector, in special after the reform of 1978. Similarly, in a recent research Diao et al. (2017a) shows that the latest growth process of African economies has been associated to a clear structural transformation, given by a significant decline of labor share in the agricultural sector, as well as a systematic increase of labor force in manufacturing and services production. Meanwhile, Diao et al. (2017b) find that the East Asian economies experienced a clear industrialization process for the last two decades. Instead, growth acceleration of Latin America was based on rapid within-sector labor productivity growth, while Africa experienced a growth-increasing structural change impulse by the demand side. Finally, in a previous work Krüger (2008) presents evidence of structural change for the US economy during the 1948-2000 period, given by both a decreasing trend in the shares of valued-added and employment shares in the primary and secondary sectors, as well as a clear increasing tendency in the tertiary sector.

In turn, Jorgenson and Timmer (2011) present new findings of structural change. They claim that the analysis of structural change requires a radical shift of emphasis from goods to services production. In fact, their evidence shows that the agricultural sector has become small, while services now comprise about three-quarters or more of GDP. In this framework, their research is related to a disaggregated analysis, which reveals substantial heterogeneity within the services sector. Personal, finance, and business services follow the classical pattern of low productivity growth and increasing shares in employment and production, while the shares of non-market services in GDP and employment have also continued to rise. Besides, they find that the shares of distribution services have been stable.

On the other hand, Dutt and Lee (1993) explored the role of the service sector in the development process for a cross-section sample of countries. They find that the average of real GDP growth rate across countries is negatively related to the average service share in employment for the 1960s and 1970s. Nonetheless, they indicate that in the 1980s the growth rate is positively associated to the growth rate of service output. In turn, Kuznets (1971), Maddison (1980), and particularly De Vries et al. (2015) for the case of 11 Sub-Saharan countries and Latin America, present evidence showing that the

productivity growth in the services sector was much lower than in the rest of the economy, which can explain the findings of Dutt and Lee for the 1960s and 1970s. In this sense, according to Rodrik (2016), industrialization contributes to economic growth both because of the reallocation of resources effect and because manufacturing tends to experience relatively stronger productivity growth over the medium to longer term. From this perspective, the premature deindustrialization jointly with the increasing role of the services sectors that he finds in developing countries can be harmful for economic performance. On the contrary, Di Meglio et al. (2015), for a sample of 29 developing countries during the 1975-2005 period, present evidence that differs with such statement. In fact, they show that the service sector, and in particular business services, favors growth productivity in the economy.

Thus, until now the literature has widely analyzed the structural change during the economic development and indicates that there is a consensus about the increasing participation of industrial and particularly services sectors during the growth process. Nonetheless, in general previous findings do not present comparative evidence for a worldwide sample of countries on the structural transformation process at higher income levels. In turn, the evidence is controversial about the effects of the different sectors on economic growth. Even though most of them state that the expansion of the service sector is prejudicial for economic growth, some contributions claim that is favorable. Therefore, the question about structural transformation, i.e., the influence of the role of industrial and specially increasing services sector on economic growth is still open. Hence, this topic deserves additional study. In this sense, in order to shed some light on this controversy, the objective of this research is to point out the influence of the expansion of the industry and services on economic growth in the long run. Thus, in first place we analyze the evolution of the sectorial production shares, and secondly the impact of the increasing participation of industrial and services sectors along the development process. The study is carried out for a worldwide sample of countries, as for the different regions that compose the total sample, along the development process, and encompasses a sample of 39 countries with different development level during the 1960-2011 period. Each region corresponds to different average per capita income level, and then to different stages of economic development. In relation to the last point, we analyze the effect of the structural transformation on economic growth. In particular, we are interested in determining if the relative expansion of the service sector has a deleterious or a favorable effect on economic growth, as what activities into this sector are more growth promoting. Following to Syrquin (1988), the hypothesis of this research is that economic development is seen as an interrelated set of long-run process of structural transformation a trend to industrialization and then to the prevalence of the role of services. In turn, this process of rising of industry and the services effect long run economic growth.

The contribution of this paper is twofold. First, this present actualized evidence of structural change of the countries in the development processes both for worldwide level and among different regions, which allow state comparative evolution of such processes.

In second place, it seeks determine the impact of the preponderance of the different sectors on economic growth, that in turn let explain the catch up of some emerging countries regions. The novelty is that the evidence found in this research is both for the total world sample and for regions with different social and economic features, and in particular the estimation of the effect of the structural change on the economic growth. This change consists in the increasing predominance of the industry and mainly services sectors during the process of development. Similarly, to previous findings, the results here confirm this pattern of development previously in the literature. Interestingly, the evidence found here shows that there is a hump-shaped relationship between industrial production and income, that is verified both at worldwide level and for all regions. In turn, the industrial sector is favorable, but services are detrimental for growth. The intuition is that services are nor tradable, so that these can be destined to the domestic market. Hence, contrarily to the industrial sector, services production is limited by the smaller size of this in relation to the world market. In turn, these factors could be behind the catch-up process of emerging countries recently verified in the literature (see, for example, Milanovic (2016), among other contributions). Finally, services activities related to business are growth promoting, while government services are discouraging.

The next section presents the data and methodology that we use in this work. Section 3 shows a descriptive statistic of the structural change verified during the development process. Section 4 presents the empirical findings of the economic growth effect on the structural change. Section 5 illustrates on the relation between a higher services sector share on economic growth. Finally, Section 6 presents the conclusions.

## 2. DATA AND METHODOLOGY

The database used in this work comes from to sources. First, the shares correspond to the Groningen Growth and Development Centre (GGDC)<sup>1</sup>. Second, the rest of the macroeconomic variables were extracted from the World Bank. The study includes all the countries in the descriptive statistics section, dividing them by regions, which are also provided and defined by the GGDC. However, the estimation analysis excludes those countries with missing values in the government sector, because of its very high weight into the tertiary sector.

Table 1 shows how many observations come from each region. The three sectors are defined in the following form: The primary sector comprises the value added by the agricultural (AGR) and mining (MIN) activities. The secondary includes manufacturing (MAN), construction (CON) and Utilities (PU). Finally, the tertiary sector encompasses trade, restaurant and hotels (WRT), transport, storage and communication (TRA), finance, insurance, real estate business services (FIRE), government services (GOV) and other services (OTH).

<sup>1</sup> <https://www.rug.nl/ggdc/>

**Table 1.** Descriptive Statistics. Main Macroeconomic Variables and Sectorial Participation, Total Sample and Particular Economic Regions.

Variable	EU	LAM	AS	MENA	US	SSA	Total
Observations	357	469	525	53	51	573	2.1
Per capita income	30079	6209	8634	1435	33090	1908	10910
Investment / GDP	23.11	20.92	27.83	21.71	22.40	19.26	22.91
Economic Growth	2.33	1.73	4.29	2.79	2.10	1.70	2.50
S1	0.06	0.12	0.28	0.38	0.04	0.42	0.24
S2	0.32	0.3	0.3	0.24	0.22	0.18	0.26
S3	0.62	0.58	0.42	0.37	0.74	0.4	0.5

*Note:* EU is Europe, LAM is Latin America, AS is Asia, MENA is Middle East and North Africa, US is North America, which includes only the United States (US) in the database, so that from now on only this country is considered for this region and we keep this country for analysis due its weight in the World GDP, and SSA is referred to the Sub-Saharan Africa.

The descriptive statistics sort the observations by GDP per capita level, so that these show at a glance the evolution of the three shares of value added to the product in relation to the income level of the countries under analysis.

For the estimations a classic regression of economic growth is performed. The explanatory variables of growth are the control variables are the suggested by Levine and Renelt (1992), mentioned below, and the shares on GDP of the sectors mentioned above (i.e., S1, S2 and S3, respectively). The estimation methods applied here use both cross-section and panel regressions for the whole sample. Nonetheless, at regional level only fixed effects specifications are applied. This is because of the results of the F test indicate the presence of such effects, which is expectable when the analysis is performed in this kind of heterogeneity between observational units. Formally, the model is defined as follows:

$$y_{it} = \beta_0 + \beta_1 S_{it} + \Gamma X_{it} + \mu_{it},$$

where  $y_{it}$  denotes the GDP growth, and the coefficient of interest is  $\beta_1$ , where  $S_{it}$  indicates the shares included in the regression (S1, S2 or S3). The same structure is then transformed in order to estimate fixed effects models by demeaning the variables (Cameron and Trivedi, 2005).

The resulting growth model so it is specified in function of the control variables,  $X$  (the investment and exports as ratios of GDP, and the population growth), and the shares specified earlier. These shares are specified in different equations, one at a time. Finally, in order to check the synergy between the investment and the share of secondary sector, an interaction term between them is added.

### 3. EVIDENCE OF STRUCTURAL CHANGE: THE EVOLUTION OF SECTORIAL SHARES

This section presents descriptive statistics on the structural change of the economy for the total sample of the countries under study, and for the regions included in it, i.e., US and Europe, Asia, Latin America and Sub-Saharan Africa (SSA).

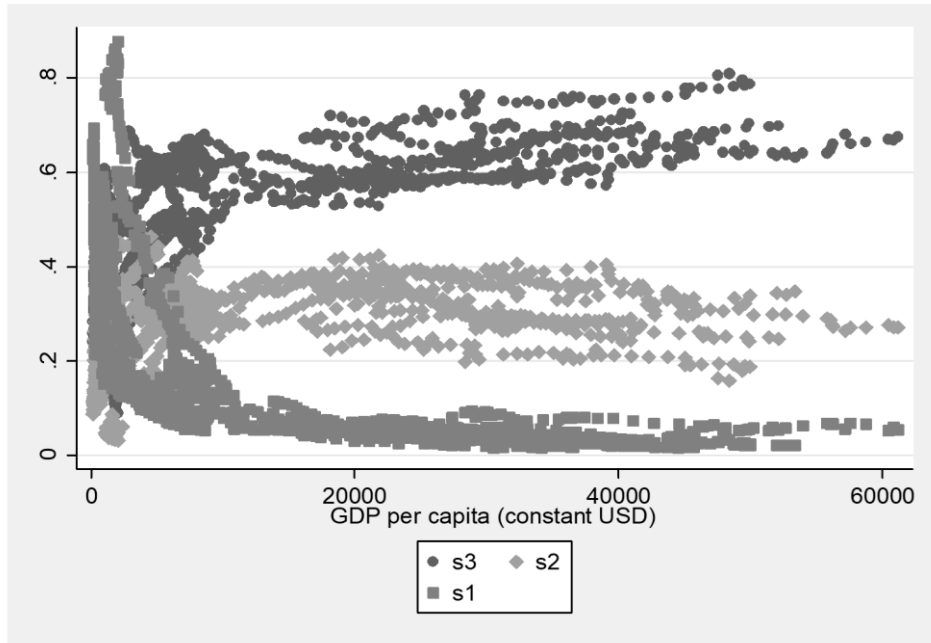
Not surprisingly, Table 1 shows a clear higher per capita income of the most advanced regions, i.e., US and Europe, followed by the Asian countries, Latin America and finally SSA. In second place, the most dynamic region is Asia, with the highest levels of the investment/GDP ratio and annual per capita economic growth during the period under study.

Table 3 presents the average shares of sectorial aggregated value of the three broad sectors that compose the economy, i.e., the primary, industrial and services sectors, both for the total sample and for all the regions above mentioned. For the case of the total sample there is a clear predominance of the service sector in the total GDP. In turn, there is a higher participation of the industrial, and mainly of the service sector, in the regions of higher per capita income levels, i.e., US and Europe, which indicates the structural transformation of the economy during the process of development previously found in the literature. Besides, Latin America presents a higher participation of the services in GDP in relation to Asia, which supports the hypothesis of premature deindustrialization claimed by Rodrik (2016), whilst the SSA countries have a notorious higher predominance of the primary production than the other regions, which is clearly associated with its low per capita income.

On the other hand, Figures 1 to 5 in the appendix show the evolution of the sectorial aggregated value shares at different per capita income levels during the 1960-2011 period, both for the total sample and at regional level<sup>2</sup>. In this sense, given the similar per capita income level and the sectorial shares of US and the European region, from now on both are considered jointly in the rest of the analysis. Once again, they indicate that in general there is a predominance of service sector at higher per capita income levels. For the total sample these results are compatible with the previous consensus in the literature on the structural transformation during the development process. In particular, Figure 1 shows a sharp decreasing trend of the primary sector production and a notable higher predominance of the services sector share on GDP at higher income levels. However, only in the case of Latin America (Figure 3) the evidence seems to indicate a hump-shaped relationship between industrial production share and the per capita income, while in the other figures as in the total sample as in the other regions there is not a clear profile. Thus, in order to arrive to a more precision relation between the industrial production and GDP, the next section presents the estimation results of

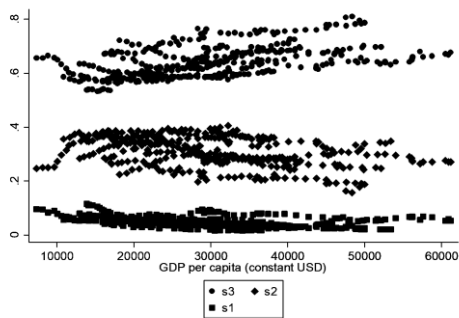
<sup>2</sup> The figures of the patterns are very similar if the analysis is made with the shares of employment. This figures are available upon request. For simplicity we kept only the shares in production for the analysis.

the effects of the different sectors on economic growth.

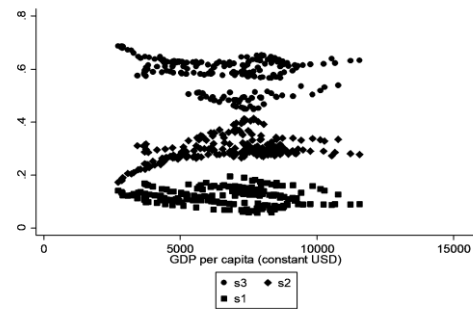


Source: own elaboration (the same is valid for the following figures).

**Figure 1.** Evolution of Sectorial Aggregated Value Share for the World Sample

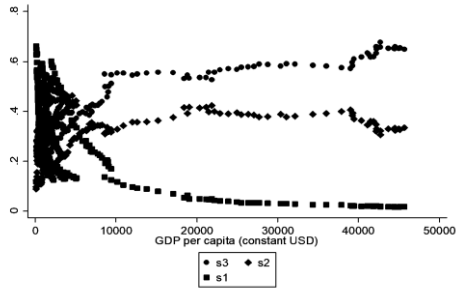


**Figure 2.** Evolution of Sectorial Aggregated Value Share for the US and Europa

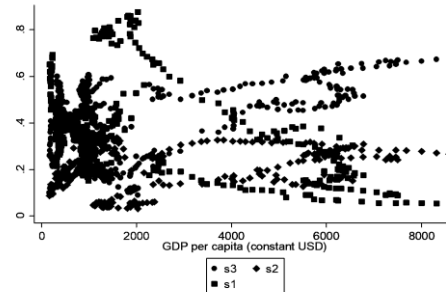


**Figure 3.** Evolution of Sectorial Aggregated Value Share for Latin America





**Figure 4.** Evolution of Sectorial Aggregated Value Share for Asia



**Figure 5.** Evolution of Sectorial Aggregated Value Share for Sub-Saharan Africa

Nonetheless, structural change at regional level presents interesting differences (see Figures 2 to 5). In both the most advanced countries (i.e., US and Europe) and Latin America, despite they have very different income levels, the service sectorial share is always higher than the industrial participation, and in turn this is always higher than the primary one, but the history is different for Asia and SSA. Both regions present a very similar evolution of the structural transformation than the total sample, but the former presents a clearly higher per capita income and higher industrialization levels.

#### 4. THE EFFECT OF STRUCTURAL CHANGE ON ECONOMIC GROWTH

This section presents evidence on the effect of the structural change in production, and particularly of the increasing participation of service sector, on economic growth.<sup>3</sup> In turn, as the services sector encompasses much and diverse branches of production, we analyze how each one of these activities affects the economic performance. In this sense, this sector is disaggregated in five subgroups, and then the results of their effect on growth both for the total sample and for each region is presented.

With regards to the influence of structural transformation on economic growth, in general for the total sample and the most advanced areas, i.e., US and Europe, the results are compatible with previous findings (see Tables 2, 3 and 4). In turn, Tables 2 and 3 include jointly S1 and S3 as explicative variables, and even with high variance inflation factor (VIF above 10) due to the collinearity between shares, the shares remain significant in the regressions. Not surprisingly, investment is in most cases significant

<sup>3</sup> The regressions presented here correspond to the effect of structural change of production on economic growth. The estimation results of the employment structural change are similar to the aggregated value, so that they were not included in this paper, but they are disposable upon request.

and positive to explain economic growth. In turn, the share<sup>4</sup> of industrial production and the interaction term between this sector and investment, WIND, affect positively economic growth, as for the total as for Asia and the SSA regions (see Tables 6 and 7). An explanation for this result can be found in Rodrik (2016), who states that manufacturing tends to be technologically a dynamic sector, has traditionally absorbed significant quantities of unskilled labor, and is a tradable sector. This last feature is particularly relevant, because implies that it does not face the demand constraints of a home market populated by low-income consumers. Meanwhile, the effect of services sector share on economic growth is negative, which is compatible with the evidence presented by Dutt and Lee (1993) mentioned above. In turn, this result can be understood following Kuznets (1971), Maddison (1980), and de Vries et al. (2015), who find that the productivity growth in the services sector is lower than in the rest of the economy.

**Table 2.** Sectorial Aggregate Value Share and Economic Growth, Total Sample.  
OLS Estimations.

Estimations Variables	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth
Constant	-3.09*** (0.44)	-2.69*** (0.62)	-0.05 (0.76)	0.68 (0.74)	-0.36 (1.46)
INV/GDP	0.21*** (0.01)	0.213*** (0.02)	0.20*** (0.01)	0.13*** (0.02)	0.20*** (0.01)
WIND				0.16** (0.06)	
POP	-0.19 (0.13)	0.12 (0.12)	-0.13 (0.12)	0.012 (0.14)	-0.14 (0.13)
X	0.01 (0.01)	0.017 (0.01)	0.01 (0.01)		0.005 (0.06)
S1	3.25*** (0.72)				0.41 (1.65)
S2		-0.88 (1.66)			
S3			-4.20*** (0.92)	-4.35*** (0.93)	-3.77*** (1.90)
Observations	1286	1286	1260	1315	1315
R-squared	0.15	0.19	0.15	0.13	0.15

*Notes:* Standard errors are in parenthesis. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The control variables are INV (ratio Investment/GPD), WIND is the interaction term between investment and S2, POP (total population growth), and X (exports/GDP), while S1, S2 and S3 are the primary, industrial and services sectors, respectively. This is valid for the following tables.

<sup>4</sup> For the regressions made by regions, with smaller number of observations, the VIF where above 20, and in order to avoid multi collinearity problems, we perform the regressions adding only one share at the time.

**Table 3.** Sectorial Aggregate Value Share and Economic Growth, Total Sample.  
Panel Data Estimations.

Estimations Variables	(1) Growth	(2) Growth	(3) Growth	(4) Growth	(5) Growth
Constant	-1.95** (0.92)	-2.90*** (0.90)	1.41 (1.45)	-0.14 (1.43)	-0.37 (1.46)
INV/GDP	0.17*** (0.02)	0.14*** (0.02)	0.17*** (0.02)	0.05 (0.03)	0.20*** (0.01)
WIND				0.37*** (0.08)	
POP	0.08 (0.24)	0.22 (0.23)	-0.05 (0.24)	0.12 (0.24)	-0.14 (0.12)
X	0.01 (0.01)	-0.00 (0.01)	0.01 (0.01)		0.005 (0.06)
S1	0.94 (2.03)				-5.071 (2.84)**
S2		6.26** (2.79)			
S3			-5.86** (2.38)	-2.14 (2.35)	-10.06*** (3.43)
Observations	1286	1286	1286	1315	1286
R-squared within	0.06	0.06	0.062	0.072	0.06

*Note:* Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The control variables are INV (ratio Investment/GPD), WIND is the interaction term between investment and S2, POP (total population growth), and X (exports/GDP), while S1, S2 and S3 are the primary, industrial and services sectors, respectively.

Table 5 shows the case of Latin America. In this region neither investment nor the sectorial shares are significant to explain economic growth. The explanation of this result can be that behind the growth process and the long run stagnation that has suffered this region are other factors, like the high-income inequality, and the chronic economic instability. Interestingly, the results for Asian countries are different. Table 7 shows that in general also here investment promotes growth. In turn, differently from the total sample, the advanced economies, and Latin America, in this case the participation of both industrial and services production favors economic growth. In particular, the positive effect of services sector is compatible with the evidence found by Dutt and Lee for the 80s decade and Di Meglio et al. (2015) mentioned above. The intuition is that in general in Asian countries the activities included in the production of services may be complementary of export-oriented industrial sector. In turn, differently to the total sample, the share of primary production impacts negatively on economic growth. In order to point out what services activities impulse or reduce economic growth the effect of disaggregated production of this sector is presented below.

On the other hand, Table 7 shows that for SSA countries investment and exports in general affect positively economic growth. Surprisingly, and differently to the rest of the sample, the participation of primary sector on GDP promotes growth, while the

influence of the share of industrial and services sectors is negative. This result can be due to the fact that this is a case of lower income countries, with massive population living below the poverty line and with exports mainly based in primary goods. Hence, is intuitively acceptable that higher primary production, associated to the satisfaction of basic needs, and then to a higher standard of life of the population, as well as to most dynamic exports, can be favorable to the economic performance of the region.

In short, our evidence is clear for the total sample but very heterogeneous for the different economic areas under study, which presents large differences in their per capita income level. This implies that the effect of structural change on economic growth differs among different stages of development. In particular, in most advanced economies industrial production favors growth, while the services sector is detrimental. In turn, in a successful emerging area like Asia, with the highest growth rate, the expansion of both industrial and services sectors affects positively economic growth. In the case of a very unequal, unstable and relatively stagnant area like Latin America the structural change seems not to play any role on economic performance. Finally, in SSA, i.e., the poorest region of the world, primary production is a key factor in the growth process.

**Table 4.** Sectorial Aggregate Value Share and Economic Growth, US and Europe.

Estimations Variables	(1) Growth	(2) Growth	(3) Growth	(4) Growth
Constant	-4.39*** (1.43)	-7.51*** (1.72)	6.94** (3.11)	4.97 (4.82)
INV/GDP	0.31*** (0.05)	0.24*** (0.05)	0.24*** (0.05)	0.18 (0.12)
WIND				0.184 (0.34)
POP	-1.38*** (0.42)	-1.343*** (0.41)	-1.260*** (0.414)	-1.31*** (0.42)
X	-0.02 (0.02)	-0.00 (0.02)	0.004 (0.0219)	
S1	12.33 (9.09)			
S2		15.38*** (4.44)		
S3			-15.26*** (4.03)	-11.81 (7.17)
Observations	349	349	349	349
R-squared	0.15	0.18	0.18	0.18

*Note:* Standard errors are in parentheses. For each region the regressions are estimated in panel data. The control variables are INV (ratio Investment/GPD), WIND is the interaction term between investment and S2, POP (total population growth), and X (exports/GDP), while S1, S2 and S3 are the primary, industrial and services sectors, respectively.

**Table 5.** Sectorial Aggregate Value Share and Economic Growth, Latin America.

Estimations Variables	(1) Growth	(2) Growth	(3) Growth	(4) Growth
Constant	0.27 (5.36)	-3.25 (5.38)	15.96 (12.11)	20.21 (16.39)
INV/GDP	0.15 (0.11)	0.07 (0.12)	0.093 (0.11)	0.32 (0.40)
WIND				-0.61 (1.07)
POP	-0.17 (0.92)	-0.03 (0.90)	-0.16 (0.89)	0.68 (0.63)
X	-0.12 (0.08)	-0.11 (0.08)	-0.11 (0.08)	
S1	5.02 (27.45)			
S2		17.91 (17.00)		
S3			-24.24 (18.76)	-38.86 (28.28)
Observations	183	183	183	183
R-squared	0.038	0.044	0.047	0.038

**Table 6.** Sectorial Aggregate Value Share and Economic Growth, Asia

Estimations Variables	(1) Growth	(2) Growth	(3) Growth	(4) Growth
Constant	1.05 (2.05)	-6.22*** (1.80)	-7.71*** (2.39)	-8.59*** (2.31)
INV/GDP	0.13*** (0.03)	0.15*** (0.03)	0.18*** (0.03)	0.038 (0.05)
WIND				0.41*** (0.11)
POP	1.80*** (0.51)	1.42*** (0.49)	1.32*** (0.49)	2.01*** (0.47)
X	-0.03 (0.02)	-0.01 (0.02)	0.00 (0.02)	
S1	-12.29*** (3.47)			
S2		11.42** (4.57)		
S3			9.87** (4.67)	9.89** (4.39)
Observations	331	331	331	331
R-squared	0.16	0.15	0.14	0.17

*Note:* Standard errors are in parentheses. For each region the regressions are estimated in panel data. The control variables are INV (ratio Investment/GPD), WIND is the interaction term between investment and S2, POP (total population growth), and X (exports/GDP), while S1, S2 and S3 are the primary, industrial and services sectors, respectively.

**Table 7.** Sectorial Aggregate Value Share and Economic Growth, Sub-Saharan Africa.

Estimations Variables	(1) Growth	(2) Growth	(3) Growth	(4) Growth
Constant	-4.51** (1.93)	-4.26* (2.21)	4.52 (2.86)	4.10 (2.62)
INV/GDP	0.18*** (0.04)	0.09** (0.04)	0.12*** (0.04)	-0.10 (0.07)
WIND				1.00*** (0.26)
POP	-0.62 (0.43)	-0.34 (0.40)	-0.77* (0.43)	-1.08** (0.45)
X	0.07** (0.03)	0.09*** (0.03)	0.075** (0.032)	
S1	9.18** (4.44)			
S2		11.06 (8.21)		
S3			-12.09*** (4.36)	-3.49 (4.42)
Observations	375	375	375	404
R-squared	0.053	0.046	0.062	0.071

*Note:* Standard errors are in parenthesis. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The control variables are INV (ratio Investment/GPD), WIND is the interaction term between investment and S2, POP (total population growth), and X (exports/GDP), while S1, S2 and S3 are the primary, industrial and services sectors, respectively.

In turn, as it was mentioned before, given that the services production composes a very widespread sector and it is clearly preponderant in the total production, this study intends to point out the effect of the particular activities into this sector on economic growth. Hence, this is disaggregated into five subsectors: trade, restaurants and hotels (TRH), transports, storage and communications (TSC), finance, insurance, real state and business services (FIREB), government services (GS) and community, social and personal services (CSPS).

Table 8 shows the descriptive statistics of each services sector subsectors both for the total sample and in each region. Surprisingly business activities, that in general would be the more invigorating activity, is higher in Latin America and is about the world average value in Asia, which was the more rapid growth region. In turn, in the former GS was clearly greater than in and Europe than in Asian countries. This first approximation can give an intuition on what factors were behind the dissimilar economic performance around the world. FIREB investments might not have been conducive to a sustained economic growth in Latin America, and the higher GS expenditures there, in Europe as well as in SSA countries could explain the poor growth in these regions. Differently, Asia disposes of an abundant and cheaper labor factor, and as Rodrik (2016) claims these economies present a clear comparative advantage to achieve a deeper world insertion. Hence, the business activities could be more rentable

and more growth promoting there.

**Table 8.** Descriptive Statistics of The Services Sector Subsectors and the Total Economic Growth Rate for the Worldwide Sample and In Each Region.

	Variable	Obs	Mean	Std. Dev.	Min	Max
TOTAL	Growth	1962	2.54	4.34	-26.53	30.36
	TRH	1537	0.16	0.04	0.03	0.28
	TRA	1537	0.07	0.03	0.00	0.17
	FIREB	1537	0.07	0.06	0.00	0.35
	GS	1537	0.16	0.09	0.00	0.47
	CSPS	1537	0.04	0.03	0.00	0.16
ASIA	Growth	514	4.30	4.38	-26.53	16.05
	TRH	345	0.15	0.05	0.06	0.28
	TRC	345	0.06	0.02	0.02	0.10
	FIREB	345	0.06	0.04	0.00	0.16
	GS	345	0.09	0.06	0.01	0.29
	CSPS	345	0.05	0.04	0.01	0.16
LAM	Growth	460	1.73	4.24	-14.32	16.22
	TRH	208	0.19	0.03	0.13	0.24
	TRC	208	0.07	0.02	0.02	0.13
	FIREB	208	0.11	0.05	0.03	0.27
	GS	208	0.17	0.03	0.12	0.27
	CSPS	208	0.05	0.02	0.02	0.09
SSA	Growth	497	1.701	5.30	-17.55	30.36
	TRH	530	0.15	0.05	0.03	0.28
	TRC	530	0.07	0.04	0.00	0.17
	FIREB	530	0.05	0.03	0.00	0.18
	GS	530	0.12	0.06	0.00	0.22
	CSPS	530	0.03	0.02	0.00	0.09
EU	Growth	400	2.31	2.31	-5.99	10.80
	TRH	401	0.17	0.04	0.09	0.28
	TRC	401	0.07	0.02	0.03	0.12
	FIREB	401	0.08	0.09	0.00	0.35
	GS	401	0.28	0.05	0.18	0.47
	CSPS	401	0.06	0.01	0.03	0.12

*Note:* TRH: Trade, Restaurants and Hotels

TSC: Transport, Storage and Communications

FIREB: Finance, Insurance, Real Estate, Business Services

GS: Government Services

CSPS: Community, Social and Personal Services

**Table 9.** The Effect of Services Sector Subsectors on Economic Growth.

Variables	(1) Total Sample OLS	(2) Total Sample Panel	(3) ASIA	(4) LAM	(5) SSA	(6) EU
TRH	-0.92 (2.77)	15.87*** (5.85)	18.20 (14.65)	115.70*** (41.35)	10.07 (9.75)	0.66 (11.50)
TSC	-10.61*** (3.85)	9.77 (7.80)	-11.58 (23.73)	34.51 (38.30)	51.37*** (19.14)	-35.28*** (10.62)
FIREB	-1.85 (1.78)	-19.62*** (5.491)	-2.763 (15.01)	-34.88* (20.70)	-42.29*** (13.32)	-15.26** (6.73)
GS	-5.51*** (1.29)	-15.01*** (5.275)	22.04 (17.87)	-1.222 (56.91)	-38.26*** (10.70)	-17.39*** (6.51)
CSPS	0.18 (4.88)	2.999 (11.49)	-6.113 (23.20)	-234.5 (186.5)	19.23 (25.29)	-8.11 (11.75)
INV/GDP	0.18*** (0.01)	0.15*** (0.02)	0.16*** (0.03)	-0.01 (0.10)	0.07* (0.04)	0.17*** (0.05)
Constant	0.24 (0.60)	-0.651 (1.418)	-4.445* (2.403)	-7.233 (15.03)	1.78 (2.23)	6.89* (3.93)
Observations	1,315	1,315	331	183	404	349
R-squared	0.13	0.07	0.12	0.14	0.08	0.17

Notes: Standard errors are in parenthesis. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. The control variables are INV (ratio Investment/GPD), WIND is the interaction term between investment and S2, POP (total population growth), and X (exports/GDP), while S1, S2 and S3 are the primary, industrial and services sectors, respectively.

The regressions results are presented in Table 9. Once again, the evidence for services sector are compatibles to that presented in Di Meglio et al. (2015), which indicates their robustness of the positive effect of business activities among different regions. In fact, in most cases business (in this case only in FIRB services) are growth promoting. In turn, trade, restaurant and hotels services are favorable for the total sample and Latin America with fixed effects, while the impact role of transport, storage and communications differs among regions. Finally, the government services reduce economic growth, while the community, social and personal services are not significant. A possible interpretation of these results is that into the services sector the activities more related with the very early stages of production, in particular the generation of business destined to promote futures economic activities, and to lesser extent those related to the later phases of production, like transport, storage and communications, seems to be more necessary and then favorable for the economic activity.



## 5. CONCLUSIONS

This work investigates the economic structural transformation along the development process, as well as the impact of the different broad sectors of the economy on growth in developed and developing countries. The evidence is compatible with the patterns of development presented previously in the literature. In general, the countries and areas with higher income levels present higher shares of production in industrial and mainly in the service sector, in detriment of the primary production. In turn, an interesting result is that the hump-shaped relationship between industrial production and income is found both for the total sample and for all the regions.

On the other hand, the regressions result show that for the total sample and the most advanced economies the industrial sector participation is favorable and services share is harmful for economic growth, which is compatible with previous findings. However, the evidence is different for the rest of the areas under study. In first place, in Latin America the economic structural transformation has no influence on growth. This result is similar to the evidence presented in Diao et al. (2017b), who find that growth accelerations were based on rapid within-sector labor productivity growth. In second place, for Asia, i.e., the more dynamic region of the world, both the output shares of industrial and services sectors have positive effects on economic growth, which could explain the high growth rates of these economies. The idea is that, differently to the other regions, in this case the investment in these two sectors, and then their expansion, impulses the aggregate growth of the economy. In the case of SSA, similarly to Diao et al. (2017b), here the evidence indicates that as exports as the primary sector share have had a positive effect on economic growth. This result can be understood in function of the very low-income level of this region, as well as because of its exports are based in primary production and have been favorable to increase the level of life of these countries. Finally, in most cases investment promotes economic growth, and in particular in the cases of Asia and SSA regions when it is allocated to industrial activities.

This evidence suggests that, in order to increase economic growth, policy recommendations must be different for each area. In particular, for the case of advanced economies the policy should be oriented to promote industrial activities. For Latin America, considering the results found here and in previous studies of growth determinants for the region mentioned above, a deeper study of the potential of competitive degree of the industrial sector seems to be necessary. The application of tax reduction and certain facilities that allow greater technological development of this sector could impulse a more dynamic industrial exports production. For Asian countries both industrial and services sector should be encouraged, and for the SSA region the governments should be inclined to favor a higher productivity of the primary production. Meanwhile, the high significance of WIND shown in Tables 6 and 7 suggests that in both regions the policy makers must impulse the investment in the secondary sector.

In turn, disaggregated evidence into the services sector indicates that the activities

more related with the very early stages of production, in particular the generation of business destined to promote future economic activities, and to lesser extent those related to the later phases of production, like transport, storage and communications, seems to be more necessary and then favorable for the economic activity. Interestingly, these results are compatible with previous findings, which suggest the robustness of the positive effect of business activities.

Finally, even though this research presents disaggregated results on the role of the services sector in the five subsectors shown before, this approach still remains at a very aggregated level. In fact, each one of these five branches encompasses much and diverse activities, so that it seems useful and necessary future investigation of the services activities at a more detailed level. In special, some services activities related to tradable productions, like tourism and exports and imports production, should be relevant in economies with low income and small domestic markets. In turn, once again the influence of the different economic sectors must be different between countries with different income level in each region. Thus, future study of this topic should be especially fruitful.

## REFERENCES

- Bahar, D. and M. Santos (2018), "One More Resource Curse: Dutch Disease and Export Concentration," *Journal of Development Economics*, 132(1), 102-114
- Berry, A. (1978), "A Positive Interpretation of the Expansion of Urban Services in Latin America, with Some Colombian Evidence," *Journal of Development Studies*, 14(2), 210-231.
- Cameron, A. and P. Trivedi (2005), "Linear Panel Models: Basics," in *Microeconometrics: Methods and Applications*, Cambridge University Press, 697-746.
- Castillo, M. and A. Neto (2016), "Premature Deindustrialization in Latin America," *Serie Desarrollo Productivo*, CEPAL and Deutsche Zusammenarbeit German Cooperation, 209, 1-29.
- Chen, S., G. Jefferson and J. Zhang (2011), "Structural Change, Productivity Growth and Industrial Transformation in China," *China Economic Review*, 22(1), 133-150.
- Chenery, H. (1960), "Patterns of Industrial Growth," *American Economic Review*, 50(4), 624-654.
- Chenery, H. and L. Taylor (1968), "Development Patterns: Among Countries and Over Time," *Review of Economics and Statistics*, 1(4), 391-416.
- Chenery, H. and M. Syrquin (1975), *Patterns of Development 1950-70*, Oxford University Press, London, England.

- Chenery, H. and M. Syrquin, (1986), "Typical Patterns of Transformation," in *Industrialization and Growth*, 37-83, Hollis Chenery, Sherman Robinson and Moshe Syrquin, Oxford University Press, New York, United States.
- De Vries, G., Timmer, M. and K. De Vries (2015), "Structural Transformation in Africa: Static Gains, Dynamic Losses," *Journal of Development Studies*, 51(6), 674-688.
- Diao, X., K. Harttgen, and M. McMillan (2017a), "The Changing Structure of Africa's Economies," *World Bank Economic Review*, 2(1), 412-433.
- Diao, X., M. Mc Millan and D. Rodrik (2017b), "The Recent Growth Boom in Developing Economies: A Structural Change Perspective," NBER Working Paper No. 23132.
- Di Meglio, G., J. Gallego, A. Maroto and M. Savona (2015), "Services in Developing Economies: A New Chance for Catching-up?" SPRU Working Paper Series No. 2015-32, University of Sussex.
- Dutt, Amitava K. and K. Lee (1993), "The Service Sector and Economic Growth: Some Cross-Section Evidence," *International Review of Applied Economics*, 7(3), 311-329.
- Fan, S., X. Zhang and R. Sherman (2003), "Structural Change and Economic Growth in China," *Review of Development Economics*, 7(3), 360-377.
- Gemmell, N. (1982), "Economic Development and Structural Change: The Role of Service Sector," *Journal of Development Studies*, 19(1), 37-66.
- Gozgor, G. and M. Can (2016), "Effects of the Product Diversification of Exports on Income at Different Stages of Economic Development," *Eurasian Economic Review*, 6(2), 215-235.
- Groningen Growth and Development Center Database: <https://www.rug.nl/ggdc/>
- Herrendorf, B., R. Rogerson and V. Ákos V. (2013), "Growth and Structural Transformation," NBER Working Paper No. 18996.
- Imbs, J. and R. Wacziarg (2003), "Stages of Diversification," *American Economic Review*, 93(1), 63-86.
- Jorgenson, D. and M. Timmer (2011), "Structural Change in Advanced Nations: A New Set of Stylised Facts," *Scandinavian Journal of Economics*, 113(1), 1-29.
- Klinger, B. and D. Lederman (2011), "Export Discoveries, Diversification and Barriers To Entry," *Economic Systems*, 35(1), 64-83.
- Krüger, J. (2008), "Productivity and Structural Change: A Review of the Literature," *Journal of Economic Surveys*, 22(2), 330-363.
- Kuznets, S. (1957), "Quantitative Aspects of the Economic Growth of Nations: II. Industrial Distribution of National Product and Labour Force," *Economic Development and Cultural Change*, 5(4), 1-111.
- Kuznets, S. (1971), *Economic Growth of Nations: Total Output and Production Structure*, Harvard University Press, Harvard, United States.
- Levine, R. and D. Renelt (1992), "A Sensitivity Analysis of Cross-country Growth Regressions," *American Economic Review*, 82(4), 942-963.
- Liu, H. and T. Yang (2015), "Explaining the Productivity Growth Gap between China

- and India: The role of Structural Transformation,” *Developing Economies*, 53(2), 100-121.
- Maddison, A. (1980), “Economic Growth and Structural Change in the Advanced Countries,” in I. Leveson and J. W. Wheeler, ed., *Western Economies in Transition*, Boulder CO, Westview Press, London, England.
- Maddison, A. (1991), *Dynamic Forces in Capitalist Development: A Long- Run Comparative View*, Oxford University Press, Oxford, England.
- Milanovic, B. (2016), *Global Inequality: A New Approach for the Age Globalization*, The Belknap Press of Harvard University Press, Cambridge, Massachusetts, London, England.
- Rodrik, D. (2016), “Premature Deindustrialization,” *Journal of Economic Growth*, 21(1), 1-33.
- Syrquin, M. (1988), “Patterns of Structural Change,” in Chenery, H. and T. Srinivasan, ed., *Handbook of Development Economics*, 1(7), 203-273, North Holland, Netherlands.
- Syrquin, M. and H. Chenery, H. (1989), “Three Decades of Industrialization,” *World Bank Economic Review*, 3(2), 145-181.
- Syrquin, M. (2007), “Structural Change and Development,” in Dutt, Amitawa and Ros, Jaime, ed., *International Handbook of Development Economics*, 1(4), 48-67, North Holland, Netherlands.

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