Manufacturing Employment Elasticity and Its Drivers in Developing and Emerging Countries:Focus on Sub-Saharan Africa

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Abstract

The aim of this work is to contribute to the empirical literature on employment-GDP elasticities in four main ways. First, it provides a set of employment-GDP elasticities for a sample of emerging and developing economies, including 11 sub-Saharan countries, based on the GGDC 10-sectors database. Second, it assesses the extent to which manufacturing activities are inclusive compared to the rest of the economy, in terms of employment creation. Third, it explores the determinants of cross-country variations in employment elasticities, both on overall and manufacturing levels, focusing in particular on the role played by structural, institutional and macroeconomic variables. Fourth, the present paper attempts to measure how different the manufacturing elasticity responsiveness is to the same set of explanatory variables, compared to the overall employment elasticity. The key results of the paper can be summarized as follows: (i) Overall point estimates of elasticities typically fall in the 0–1 range, with the majority of them ranging between 0.4 and 0.7. (ii) Elasticities vary considerably across countries and sectors, with manufacturing elasticity outperforming the rest of the economy in low-income countries in sub-Saharan Africa, while it's below average in Latin American and Asian economies. (iii) Structural policies aimed at increasing labor market flexibility and accelerating the process of structural transformation have the same significant and positive impact on both overall and manufacturing employment elasticities. (iv) Macroeconomic policies aimed at reducing macroeconomic volatility have a significant and positive impact on manufacturing elasticity rather than the rest of the economy. We attribute that to the tradability characteristic of manufacturing products that exert pressure over the competitiveness of the domestic fabric and thus the scale of growth translation into employment. (v) Manufacturing activities tend to be more labor-intensive than the rest of the economy when agriculture employment is higher, suggesting that the "stock of unskilled labor in agriculture" feed growth in manufacturing more than the rest of the economy; (vi) The rule of law is a crucial determinant of how much growth is translated into employment. However, the sign of the coefficient is not consistent with the prevailing intuition. Countries with a better governance framework witness a lower elasticity and vice-versa. We argued that rule of law could be capturing the effect of the informal sector, which may allow more flexibility within labor markets. This channel seems to be effective in the manufacturing activities. (vii) Finally, it seems that elasticity at lower growth rates is bigger than elasticity at higher rates, even for the rest of the economy. However, the scale effect in the overall economy is lower than manufacturing. This could be explained by the possible scale economies in the manufacturing sector that outperform the rest of the economy. The automatization process and the substitution effect is more likely to occur in manufacturing than in services, especially considering that the above analysis has been conducted mainly over developing economies where services do not witness high productivity levels and low levels of cost-cuts.

Key words: Manufacturing, Employment elasticity, structural change, growth, productivity.

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I.   Introduction

It is historically demonstrated that developed countries have gone through what economists called the structural change. For most countries, economic and social development seems to be connected with the movement of labor and other factors of production from traditional to modern economic activities. Consequently, overall productivity rises and incomes expand (as wages are positively correlated with the level of labor productivity).

Kuznets (1966) and Kaldor (1976) founded one of the initial theoretical explanations dealing with the notion of structural transformation (or sectoral change). For these authors, the economic prosperity and the rise in living standards for a nation come through the industrialization of its economy and the increase of the share of manufacturing sectors in the total value added (and therefore in total employment), particularly during its first stage of development. Since then, economists agreed on the role manufacturing is expected to play, to sustain growth in developing countries as a first stage bridge between on the one hand primarily and traditional activities, and modern services on the other.

Rodrik (2013), famous for his proposals on this issue, argued that the expansion of manufacturing activities in developing countries, gives the agricultural employment – considered more as a form of underemployment - the opportunity to move to more productive sectors without any major investment in human capital, as required qualifications in manufacturing do not surpass significantly those of agricultural activities. Therefore, Rodrick assumes implicitly that manufacturing activities are inclusive, as growth translates to employment creation and displacement, and better livelihood. Moreover, manufacturing has two positives features that makes it a key sector for economic prosperity: 1) It exhibits scale economies unlike some services, pulling down unit costs; 2) It is a tradable sector, in which supply is not constrained by domestic demand. For these reasons among others, many economists considered manufacturing as the "main engine of growth" and a repository of more productive, remunerative and, hence, more decent jobs, particularly for rural citizens.

For a region like Sub-Saharan Africa, that lives a spectacular urbanization (numbers maybe), manufacturing development must be at the heart of economic and social development policies. In this region, there is a prevailing consensus over the abnormal followed development path, which consists over the "jump" to services sectors (qualified generally as unproductive ones) with limited manufacturing activities. This poses several issues over the sustainability of their growth model -driven by commodity export sectors- and the inclusiveness of growth in terms of employment creation.

This paper does not try to provide comprehensive analysis of the de-industrialization process, deeply addressed by researchers (Rodrik and Macmillan (2012), AfDB (2015)), but rather assess to what extent manufacturing activities, limited as they are, are inclusive in sub-Saharan Africa, compared to the rest of their economy.. The second issue this paper is trying to address is to identify the determinants of employment intensity of growth in the manufacturing sector based on a sample of 30 developing and emerging countries, including eleven sub-Saharan countries. In fact, studies tend to focus on drivers of overall employment intensity that encompass heterogeneous sectoral dynamics between growth and employment (Moosa (1997) and Padalino and Vivarelli (1997) for G-7 countries, Freeman (2001) and Kaufman (1988) for industrial countries, and Lee (2000), Baker and Schmitt (1999), and Erber (1994) for selected OECD countries). Few studies have desegregated the analysis by sectoral level (Kapsos (2005), Crivelli, Furceri and Bernaté (2012)) but still considered the secondary activities as a whole including manufacturing, construction, utilities and mining and quarrying. The present paper goes beyond these limitations and tries to assess how different manufacturing elasticity responsiveness is to a set of explanatory variables in comparison to overall employment elasticity.

This paper contributes to empirical literature on the matter by providing a new set of employment-output intensities in the manufacturing sector for eleven Sub-Saharan African economies[1] and by assessing the key factors shaping cross-country elasticities, based on a sample consisting of 29 developing and emerging countries[2] provided by the Groningen Growth and Development Centre (GGDC), covering the period 1990-2010[3]. The rest of the paper is arranged as follows: Section II analyzes structural features of the Sub-Saharan economy, with special focus on manufacturing. Section III describes the empirical approach and the dataset. Section IV presents estimations of employment intensity of growth in manufacturing. Section V discusses the results for the cross-country model, while Section VI concludes.

II.   Structural features of the sub-Saharan Africa: focus on manufacturing

In this section, we try to provide an overview of the main trends that characterized the creation of value and employment in sub-Saharan Africa during the twenty years following 1990, with special focus on manufacturing. In practice, we aim to keep track of the changes in the structure of production (value added) and employment while trying to examine the evolution of sectoral productivity and draw conclusions about most involved sectors at the levels of structural transformation. A first stylized fact observed at the level of value added (VA) evolution in sub-Saharan Africa's economies is its sustained growth, with an average rate that ranged above 3% for the whole region, and has exceeded 4% for 8 countries (out of 11). In order to identify the engines of this sustained growth that has characterized sub-Saharan economies, it is important to analyze the dynamics of value added structure.

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1. Botswana, Ethiopia, Ghana, Kenya, Malawi, Mauritius, Nigeria, Senegal, South Africa, Tanzania, and Zambia.
2. The rest of our sample is broken down as follows: Latin America: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Mexico, Peru, and Venezuela. Asia: China, India, Indonesia, Malaysia, Philippines, Taiwan, and Thailand. And two more countries from Africa: Morocco and Egypt.
3. Timmer, M. P., de Vries, G. J. and de Vries, K. (2015), "Patterns of Structural Change in Developing Countries", In Weiss J. and Tribe M. (Eds.), Routledge Handbook of Industry and Development, pp. 65-83, Routledge.

Table 1: aggregate VA, employment and relative productivity by sector in 11 sub-Saharan African economies, 1990-2010

Sectors	Added Value in %			Employment in %			Relative Productivity Ratio in %		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Agriculture	**22,3**	**27,0**	**19,1**	**63,4**	**64,8**	**58,9**	**0,35**	**0,42**	**0,32**
Industries	**39,5**	**29,9**	**30,5**	**8,7**	**8,0**	**10,1**	**4,52**	**3,75**	**3,02**
Mines	19,0	12,6	13,6	1,4	0,7	0,7	14,07	17,91	20,71
Manufacturing	11,6	9,9	8,5	5,4	5,4	6,6	2,14	1,83	1,28
Other Industries	8,9	7,3	8,4	2,0	1,9	2,8	4,51	3,93	2,97
Services	**38,2**	**43,1**	**50,3**	**27,8**	**27,2**	**30,9**	**1,37**	**1,58**	**1,62**
Markets Services	27,4	32,7	37,6	17,6	16,6	20,0	1,55	1,97	1,88
Distribution	22,7	25,1	30,7	16,6	15,2	17,6	1,37	1,65	1,74
Finances	4,6	7,6	6,9	1,1	1,4	2,4	4,33	5,42	2,84
Non-Markets Services	10,9	10,5	12,7	10,2	10,6	10,9	1,07	0,98	1,16
Administration Services	9,9	9,3	11,5	5,2	5,3	5,7	1,9	1,73	2
Other services	1,0	1,2	1,2	5,0	5,3	5,2	0,20	0,23	0,24

Source: Authors' calculations, based on the GGDC database

The table above shows that agriculture, despite the decline of its relative share between 1990 and 2010, continues to create the fifth of wealth in the studied economies compiled. On the other hand, and in gain of relative share, services occupy an essential place in the sub Saharan productive fabric with a share that has risen from 38% in 1990 to around 50% in 2010. What is striking, however, is the share of industries that grew slightly during the 2000s after a 10 percentage points decline in the 1990s. This increase in the share of industries is due to the emergence of the mining sector, the resistance of the manufacturing industries, but more importantly, due to the bloom of infrastructure-related industries, notably construction, water, gas and electricity. Along with the change of the structure of the value added, employment has experienced similar trends. However, the speed of labor reallocation, measured by the change in sectoral employment shares, was not proportional to the changes observed at employment creation shares.

Agriculture is the only sector that lost share in total employment. Nevertheless, it must be noted that this loss has been accompanied by productivity gains up to 50% between 1990 and 2010, the relative productivity of the sector, remains below the national rate. Efforts are still needed to increase the level of agriculture productivity in some countries such as Senegal where the value added of the primary sector is only driven by the increase in employment in that country. The situation is the same for Ethiopia and the Kenya where growth depends much more on jobs increasing relatively to productivity gains.

Excluding non-market services, workers moving out of agriculture have been absorbed mainly by the manufacturing sector, infrastructure-related industries and market services - distribution services in particular. With these evolutions, the share of manufacturing in employment increased from 5.4 to 6.6%, infrastructure-related industries' share increased by 0.8% to be around 2.8% and distribution's share moved from 16,6% to be around 17,7%. This movement of workers from agriculture to the mentioned areas can be described as beneficial for total productivity in sub-Saharan Africa.

Whereas the big picture indicates a decrease in the contribution of manufacturing to the value added while its share in employment increased, countries' details show a kind of heterogeneous behavior of both

value added and employment shares of manufacturing. Observations allow distinguishing between three typologies:

1. The first set of countries is featured by increasing employment and value added shares. This group contains Botswana, Ethiopia, and Tanzania. Note that those evolutions have influenced positively the relative productivity in Botswana while the impact was negative in both Ethiopia and Tanzania.
2. The first set of countries witnessed a decrease in employment and value added shares. It includes Ghana, Mauritius, Nigeria, South Africa, and Zambia (see annexes for information on relative productivity evolution).
3. For the last set of countries value added and employment share went in different directions. In addition, for all cases, impact of those evolutions on relative productivity was negative.

This taxonomy of the studied sub-Saharan countries may provide useful information on overall jobs-growth relation when combined with sectoral elasticities. Indeed, overlapping sectoral elasticities with sectoral shares in value added indicate whether the structure of an economy is employment-friendly or not.

III. Empirical approach, literature review and dataset

1. Empirical approach

The employment elasticity regarding the value-added is defined as the relative response of employment following a percentage change in value-added. In accordance with this definition, two methodologies are commonly used, and three interpretations are possible (Kapsos, 2005). The empirical literature presents two main approaches to estimate employment elasticity:

The first one consists on dividing the percentage change in employment (E) by the corresponding percentage change in value added (Y) (or Gross Domestic Product) during a given period.

Arc-elasticity :
$$\varepsilon = \frac{(E_1 - E_0)/E_0}{(Y_1 - Y_0)/Y_0} \tag{1}$$

This approach is very simple. Islam and Nazara (2000) and Islam (2004) suggested that employment elasticity estimates tend to be very instable. The alternative approach provides point-elasticity estimates using a log-linear regression.

log-linear regression:
$$lnE_t = \beta_0 + \beta_1 lnY_t + \varepsilon_t \tag{2}$$

β_1 is a parameter that measures the elasticity of employment in relation to economic growth.
β_0 is assumed to be positive, as in the case of zero economic growth, there would still be some work.
ε_t is a random term.

In this study, we consider estimates more as an "accounting measure" of the content of employment in each 1% growth and less as a robust statistical estimation. Unlike Crivelli, Furceri & Bernaté (2012) who estimated the long-term coefficient taking into consideration the persistence of employment (based on an augmented version of equation (2) where lagged employment, in natural logarithm, was considered as an additional exogenous variable). Using log-linear regression method, we estimate the value of the elasticity for a set of economies and for different sectors.

Three interpretations are possible according to the value of the estimated elasticity:

Table 2:

Employment Elasticity	Positive economic growth
$\beta_1 < 0$	Decrease in employment productivity growth
$1 > \beta_1 > 0$	Employment growth productivity growth
$\beta_1 > 1$	Employment growth Decrease in productivity

As indicated in the table above, there are three alternatives[4]. The first one refers to labor-destructing growth. This is the case generally of agriculture in some developing countries, including India[5], in which agriculture employs a large share of active population. With the mechanization of the production process and the transition towards a modern agriculture, demand for capital and/or "technology" increase at the expense of labor. The manufacturing sector in some countries is exhibiting the same changes, with a decrease in the number of employees while total value added is growing. The second case that seems more obvious is related to the growth model that creates employment but not as proportionally, suggesting that capital and/or Total Factor Productivity (TFP) are playing a role in driving growth. The third case reflects sectors where employment growth is outperforming value added growth, indicating that marginal productivity of new employees is below average. In the first two cases, productivity grows while in the last case it decreases.

Estimating overall and sectoral elasticities will respond to our two first research questions. First, it will give us the value of manufacturing's elasticity, which will indicate if this sector's growth is rather inclusive or not. A positive value indicates that manufacturing's growth create jobs. The more the elasticity's value is bigger than the nullity the more growth is rich in jobs. Second, the comparison of manufacturing's elasticity to overall elasticity will answer the following question: is manufacturing more inclusive in sub-Saharan Africa? A value that surpasses the overall economy's elasticity indicates that manufacturing is more inclusive, and vice-versa.

After doing so, we move to the second stage of our empirical approach. By identifying the factors that explain the differences observed between countries in terms of the estimated elasticities. To achieve this, we regress the estimated elasticities on a number of variables characterizing the economy, associated to macroeconomic features and structural policies related to labor market functioning.

The equation to be estimated in this case is given by:

$$\beta_n = \theta X_n + v_n$$

(3)

$$v_n \sim N(0, \sigma_\beta^2)$$

X_n : Matrix containing k columns (k determinants)
θ : Vector of coefficients associated to each of the determinants
n refers to the sample of countries included in the model.

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4. The discussion following refers to the positive economic growth case.
5. Misra, S. and Suresh, A. (2014), "Estimating Employment Elasticity of Growth for the Indian Economy", Reserve Bank of India, Department of Economic and Policy Research, Working Paper Series No. 06.

The determinants were collected according to the literature review on the growth/jobs relationship (see next section), and subjected to the data availability. Compared to the existing literature, what can be considered, here, as a contribution of the paper is the comparability approach we intend to implement, regarding the impact of the same set of variables on the manufacturing elasticity, on the one hand, and the rest of the economy's elasticity, on the other hand. In this case, we will enrich the debate over the possible divergence between the drivers of these two measures, generally omitted by academia.

2. Determinants of employment intensity of growth: a literature review

For the purpose of the current exercise, we used as dependent variables both total and sectoral employment elasticities, obtained for the full period 1990-2011. The explanatory variables were chosen based on research on employment elasticity determinants from previous findings in the literature. These variables fall into the following categories: economic structure, macroeconomic volatility and uncertainty, and labor regulation. The variables belonging to each of these categories are listed in the following table:

Table 3:

Category	Variable	Data source
Economic structure	Average annual growth, 1990-2010	GGDC database
	Share of agriculture in total value added, 1990	
Macroeconomic volatility & uncertainty	Inflation rate standard deviation, 1990-2010	World Bank
Labor regulation	Central bargaining, 2005.	Fraser institute
Institution quality	Rule of law, 1996	World Bank

The following is an overview of the underlying reasons behind the use of the variables listed above:

Economic structure: It is commonly known that the structure of wealth creation impacts the employment content of growth. While some sectors can be labor-intensive, others may be capital-intensive. Then, the part of each of these sectors impact the overall economy growth's intensity in jobs. Another channel that makes the economic structure relevant is its relation with structural change process. The weight of some key sectors in both employment and value added indicate in which stage of development the economy is standing. For example, a prominent agriculture sector corresponds to an early development stage.

The share of employment in agriculture: The share of employment in agriculture variable is based on Clark (1957), Chenery (1960), Kuznets (1966), and Syrquin (1988) finding. These articles indicate evidence of higher share of employment in agriculture sector during first stages of economic development. With the advance of structural transformation process, this share tends to decrease for the benefit of other sectors, the manufacturing and services in particular. While the services are known by their higher relative employment elasticity (Kapsos, 2005), the manufacturing sector is characterized by being labor-intensive in their early stages. Formerly, during first stages of economic development, the share of employment in the agriculture sector tends to be high and its employment elasticity tends to be low along with the total one. However, the labor movement caused by the structural transformation process may increase the national elasticity thanks to the increase of manufacturing and services shares in value added and employment. Therefore, we expect that manufacturing elasticity depends mainly over the share of agriculture in employment, as the growth model may benefit from this extra-labor supply to develop a labor-intensive industry.

Average growth (possible non-linear effect): A high employment intensity indicates that growth in output leads to considerable job creation, while low estimates of employment intensity suggests a low correlation between economic growth and employment. In the first case, we say that output growth is derived by employment growth. In the second, output growth is said to be driven by productivity gains. Indeed, the relation between average growth and employment elasticity is expected to be negative. Actually, the idea we want to test is the decreasing employment elasticity regarding growth rates. Economies that exhibit a higher growth are expected not to rely mainly on labor contribution to drive growth but, also on capital and TFP, which include technology and efficiency in the production value chain.

Macroeconomic volatility & uncertainty: Macroeconomic volatility affects the economy at a firm and industry level by introducing uncertainty into its optimization objectives trough many channels. First, the liquidity of the firm may be impacted as the obligations in the market become tight. This can lead to transaction risks. For firms that are evolved in some international transaction, macroeconomic volatility makes it difficult to project a balance of foreign positions. This is what so called the translation risk. As uncertainty impacts production inputs and outputs, investments returns become more difficult to predict. This type of invisibility constitutes an economic risk (Papaioannou (2006) and Mikhalchenko (2015)). The average annual inflation volatility was chosen as control variable to identify whether uncertainty influences the labor market dynamics. In countries with less volatile inflation, incentives to make long- term, risky investments and therefore hiring are stronger thanks to visibility (Ramey and Ramey, 1995; Judson and Orphanides, 1999; Imbs, 2007; Furceri, 2010).

Institutional quality and Rule of law: Economic institutions are among key factors behind long-term economic growth (Mauro (1995), Hall and Jones (1999), Robinson et al. (2005), Hernando de Soto (2000)). The relationship between institutions and growth manifests itself via various channels. To name a few, poor institutions reduce local and foreign direct investment (Javocik and Wei, 2009) and undermine incentives for firms to reinvest their earnings (Cull and Xu, 2005). Contrarily, in countries with stronger economic institutions incentives to make long- term, risky investments are stronger: more secure property rights, better business environment and effective rule of law (see, for instance, Olson (2000)). Additionally, good institutions are necessary to promote the establishment of domestic-led firms and to encourage the creation of small and medium-sized enterprises that are necessary for job creation (Bruno et al., 2011). The rule of law is among the most crucial institutions, regarding a company's ability to do profitable business. For a privately owned company whose continued operations are dependent on a return on investment over time, having a reasonable expectation of profit returning is critical. Indeed, there are several factors related to the rule of law such as transparency, predictability, and stability that will determine the ability of such a company to make rational investments and operating decisions. Then, social exclusion and employment outcomes are influenced by institutional quality. Strengthening institutions and improving the quality of legislation can have beneficial effects on labor demand, wages, and employment (Knack, 1999).

Manufacturing and institutions: In addition, the jobs-growth relation regarding manufacturing sector is particularly influenced by institutions regulating trade procedures and the availability of upstream inputs (Jones, 2011). Trade is an important channel through which firms can improve their access to inputs, resulting in lower prices and/or higher input variety, with the effect that this could have on employment. Prevalent corruption or the weak rule of law create economic uncertainty and insecurity for traders and investors. Arnold et al. (2011) find that reducing barriers to services trade has a positive impact on the competitiveness and the viability of manufacturing firms in Czech Republic. Analogous results have been established for the case of Indonesia (Duggan et al., 2013) and India (Bas 2014; Arnold et al., 2016). That is why, we expect a positive relation between institutional quality and employment elasticity in the manufacturing sector.

Collective bargaining: The effect of collective bargaining on wages, and other important variables such as productivity, profits or the number of hours worked is well documented. The effect of collective bargaining on employment fluctuations is closely related to its impact on wage rigidity. The collective bargaining was chosen referring to Kapsos (2005), Mourre (2004) and Döpke (2001). These previous findings suggest that greater employment protection and rigidity may be negatively correlated with employment intensity.

IV.   Estimations of employment elasticities in sub-Saharan Africa and Latin America: focus on manufacturing

Employment elasticities can be a useful complement to productivity data and can provide useful information regarding the economy's capacity to generate employment. During periods of positive economic growth, employment elasticities between zero and one indicate that there is both productivity growth and employment growth (see Table 2). Indeed, elasticities in the low positive values of this range [0, 1] indicate strong labor productivity growth, while higher elasticities correspond to more employment-intensive growth (see Kapsos, 2005). Employment elasticities have been estimated according to equation (2). In the graph below, countries have been ordered according to their GDP per capita in 1990, from the lowest, which is Ethiopia to the highest one, South Africa.

A broad fact, as shown by the graph, is related to the positive elasticities across sectors, as growth is associated to labor demand, with few exceptions to make. In addition, elasticity does not seem to be sensitive to the level of development, as we do not capture any significant downward slope of elasticity regarding GDP per capita. Indeed, growth tends to create comparable quantity of employment in the eleven economies of sub-Saharan Africa, with an elasticity ranging from 0.3 in Mauritius to 0.6 in Senegal, except for Kenya with an elasticity that is above unity.

A second remark refers to the positive intensity of growth in the agriculture sector, the major employer of the region, especially in low-income countries. In fact, agriculture is still attracting employment and growth is not fully driven by productivity gains. In general, in economies where agriculture employs over 50% of active population while still providing jobs for new entrants in the market, the structural transformation process does not seem to be on the right path. The lack of mechanization and use of technology in the sector hampers the prospects of the green revolution in the continent. As long as agriculture attracts labor (positive employment intensity), productivity gains would not be fully optimized. Many analysts consider mechanization and the move towards a modern sector to be a major factor in reducing employment opportunities and reducing the demand for unskilled labor. However, for South Africa and Mauritius with the highest GDP per capita in the region currently, agriculture sector does not provide any more jobs in the market, but on the contrary, this sector is witnessing an employment-destructive growth. In fact, a 1% increase in value added lowers employment in average by 0.12% in South Africa and 0.25% in Mauritius.

Figure 1: Employment elasticity by sector and across Sub-Saharan countries
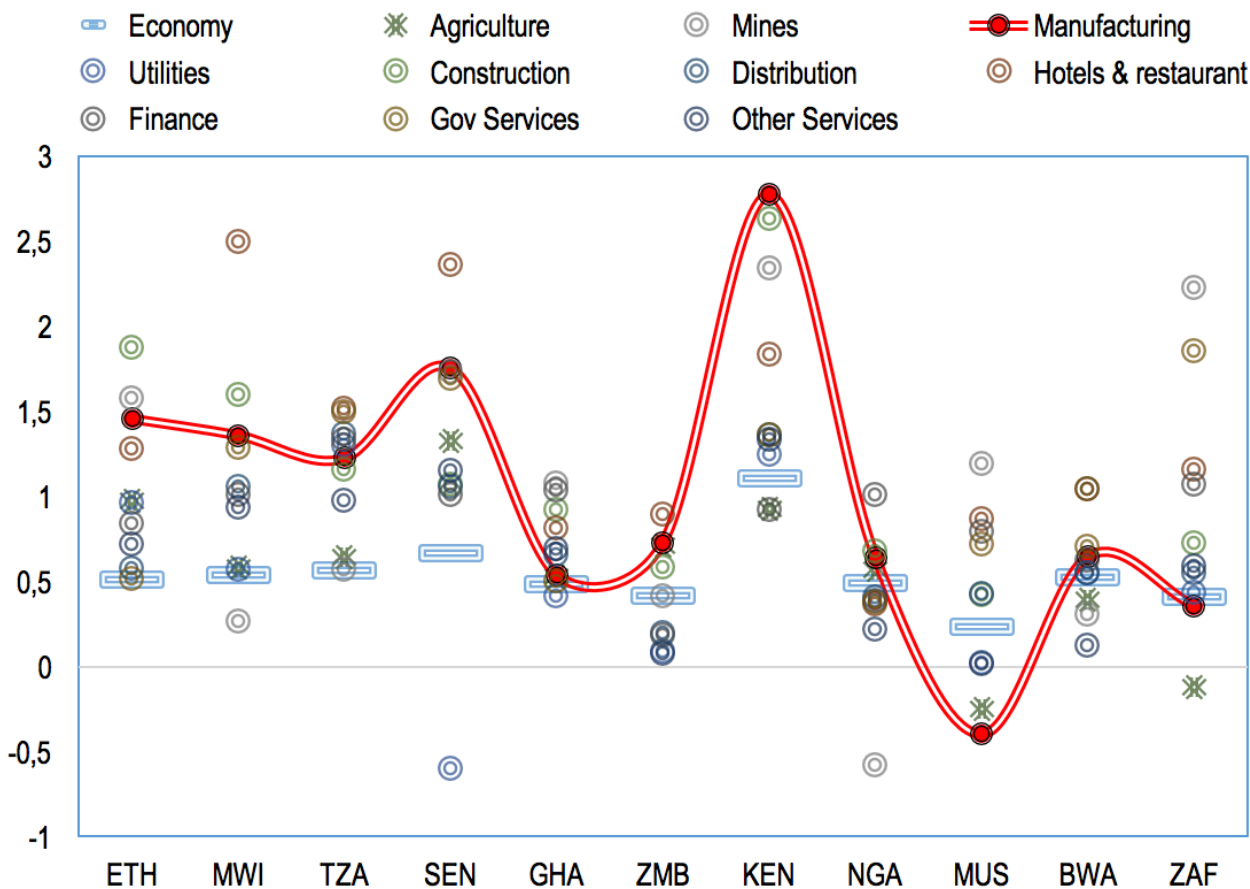
Note: ETH=Ethiopia; MWI=Malawi; TZA=Tanzania; SEN=Senegal; GHA=Ghana; ZMB=Zambia; KEN=Kenya;
NGA=Nigeria; MUS=Mauritius; BWA=Botswana; ZAF=South Africa
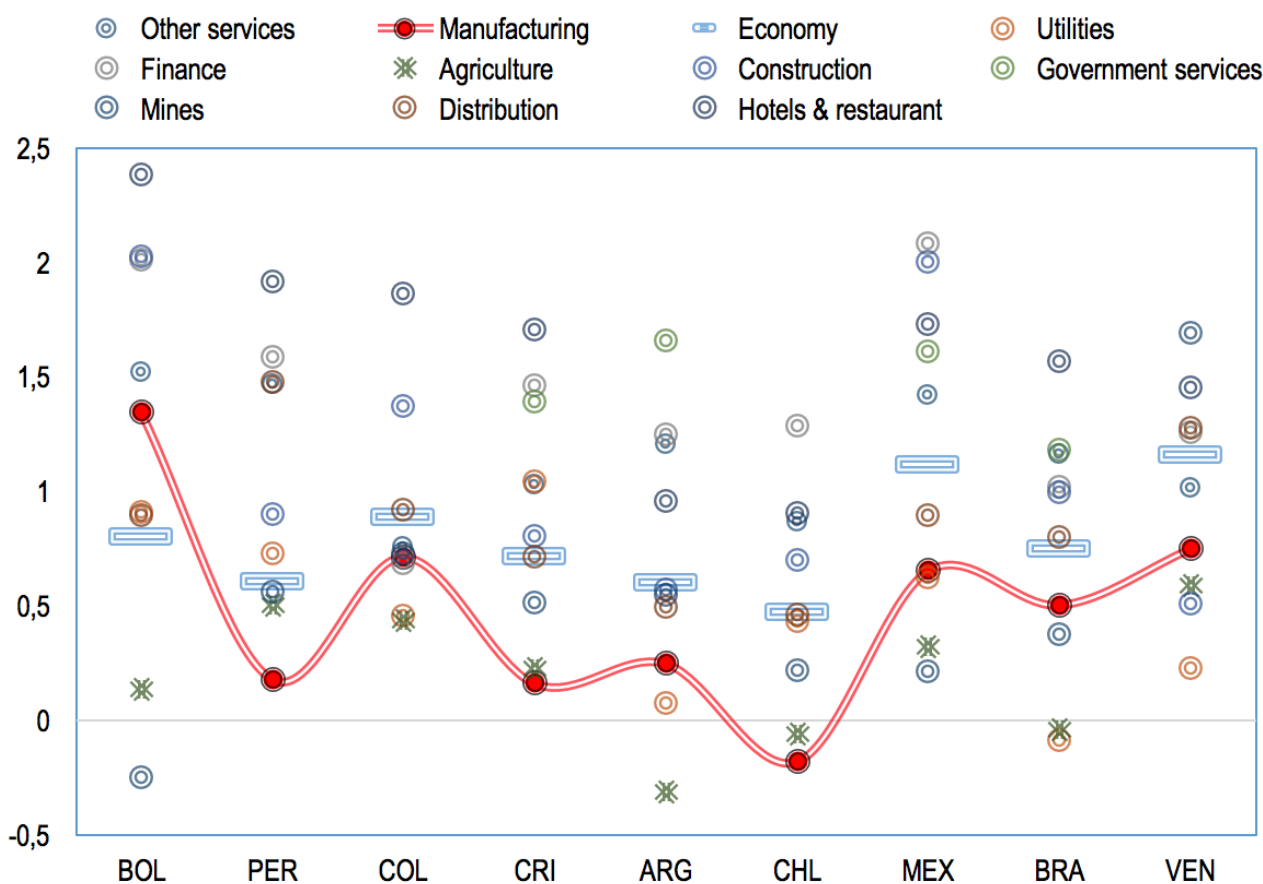Source: Authors' calculations, based on the GGDC database.

For the manufacturing activities, heterogeneity in the dynamics between growth and employment is more evident and elasticity vary considerably across countries. Elasticity falls in the -0.4 – 1.7 range, except for Kenya that seems to witness an inclusive growth in general, outperforming the rest of the sample. In fact, 1% growth of manufacturing value added raise employment by 2.8% in average during the period, meaning as we explained above, that manufacturing productivity is declining in Kenya.

Besides, elasticity in manufacturing seems to be higher than the rest of the economy, particularly for low-income countries. However, as we move to economies with higher GDP per capita, elasticity drops, reaching below average levels in South Africa and even negative levels for Mauritius. This last result seems consistent with the belief that low-income countries are asked to support and develop an inclusive manufacturing sector, in which growth dividends are well shared across the population.

Leveraging on their comparative advantage of low wages, low-income countries in sub-Saharan Africa are actually developing a labor-intensive light manufacturing model, according to the elasticity that is relatively high. Sub-Saharan Africa is more prone to develop this growth model, rather than heavy manufacturing activities, that requires skilled-labor and cutting-edge technology. Harrison, Lin, and Xu (2011) and Dinh, Palmade, Chandra, and Cossar (2012) argue that Africa is mainly located at the less sophisticated end

of the technology frontier with a comparative advantage in low-tech, and thus labor intensive activities, instead of high-tech manufacturing. Dinh, Palmade, Chandra, and Cossar (2012) revealed that even for some manufacturing activities, productivity falls within the range observed in Chinese and Vietnamese firms in some sub-Saharan economies. Further analysis also confirms this fact using the Enterprise Surveys of the World Bank, and controlling for per capita income; value added per worker appears to be consistent in Sub-Saharan areas with levels observed elsewhere Clarke (2011). Rodrick (2013) pointed out the convergence property of the manufacturing productivity, suggesting that productivity converges to international levels, regardless of the prevailing business climate. He demonstrates that the tradable characteristic of manufacturing activities puts pressure over the sector performance and allows convergence at a rapid pace, even if institutions, policies or country specific circumstances are not favorable.

Figure 2: Employment elasticity by sector and across Latin American countries

Note: BOL=Bolivia; PER=Peru; COL=Columbia; CRI=Costa Rica; ARG=Argentina; CHL=Chile; MEX=Mexico; BRA=Brazil; VEN=Venezuala
Source: Authors' calculations, based on the GGDC database.

In Latin America, the story is different. Comparing it to sub-Saharan Africa, overall employment elasticity varies across countries and seems to be higher. In fact, it ranges from 0.5 in Chile and 1.2 in Venezuela; while for sub-Saharan Africa, it falls within 0.3-0.6 range (0.3 in Mauritius to 0.6 in Senegal), except for Kenya, which has an elasticity of 1.1. For Latin America, the highest elasticities are observed for Venezuela and Mexico, with respectively 1.2 and 1.1, which have two of the highest GDP per capita in the region[6].

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6. For more information on productivity path in Latin America, see José Gabriel Palma (2011): "Why has productivity growth stagnated in most Latin American countries since the neo-liberal reforms?", Cambridge Working Papers in Economics.
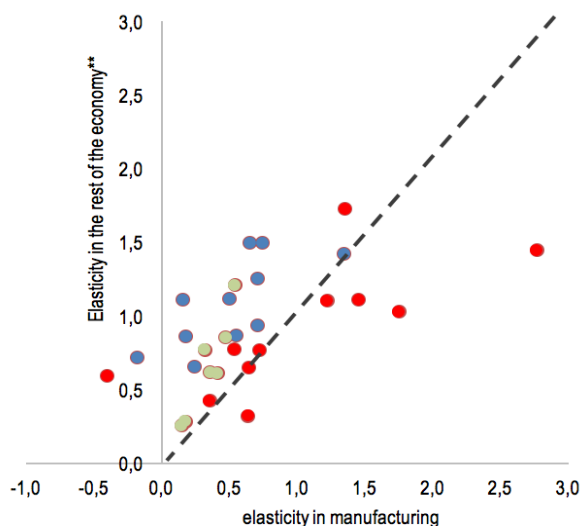
Regarding sectoral elasticities in the Latin American set of countries, it appears that growth in services is more employment-rich, compared to the rest of the economy (including manufacturing). This latter, unlike the model developed in Sub-Saharan Africa, is not labor-intensive with regard to growth, except the case of Bolivia. The high dispersion of sectoral elasticities in this country may indicate a lagged structural change compared to the rest of the Latin American set of countries, and then justify the amount of jobs created following a one percentage of growth. For all Latin American countries, manufacturing jobs to growth elasticities are below overall economies' average. In some cases, it is even lower than agriculture, like for Peru, Costa Rica and Chile. The only economy witnessing a higher employment intensity above the unity is Bolivia. The rest of the economies exhibits an elasticity below one.

To explain the observed patterns at the level of sectoral elasticities in Latin America, we refer to features prevailing after the period of import substitution policies and the debt crisis in most Latin American countries (Schiffbauer, Sahnoun, and Araujo, 2015). It was argued that labor productivity in 1990-2005 grew in the manufacturing sector by about two percent annually, while regional labor productivity in services stagnated during the same period and even declined in several countries. This decline of services productivity (knowing its important share in total economies) was counterbalanced, however, by strong productivity growth and declining labor shares in agriculture as reflected by the low value of agriculture elasticity across countries. These developments suggest that labor moved from agriculture and manufacturing was absorbed by the services sectors with the lowest productivity growth such as retail & wholesale trade, government services, finance, real estate & business services.

In spite of the explanation above and regardless of the level of development, growth in manufacturing is more driven in Latin America by productivity gains compared to Sub-Saharan Africa. Figure (4) compares the inclusiveness, in terms of employment creation, of the manufacturing sector across regions. Low-income countries in Sub-Saharan Africa specialize more in labor-intensive manufacturing, while countries in Latin America are not enjoying a generating employment growth model, in the manufacturing sector. Trade data confirms this fact and shows clearly that labor intensive products are still one of the major components of exports in Sub-Saharan Africa compared to Latin America or Asia.

Figure 4:

Elasticity of employment across sectors, in some sub-Saharan Africa (SSA), Latin America and Asia countries* (4-a)

Manufacturing exports in SSA excluding South Africa (4-b)

Sub-Saharan Africa excluding South Africa

- High-skill and technology-intensive manufactures
- Medium-skill and technology-intensive manufactures
- Low-skill and technology-intensive manufactures
- Labour-intensive and resource-intensive manufactures

Manufacturing exports in SSA (4-c)

SSA (Sub-Saharan Africa)

- High-skill and technology-intensive manufactures
- Medium-skill and technology-intensive manufactures
- Low-skill and technology-intensive manufactures
- Labour-intensive and resource-intensive manufactures

Manufacturing exports in LAIA (4-d)
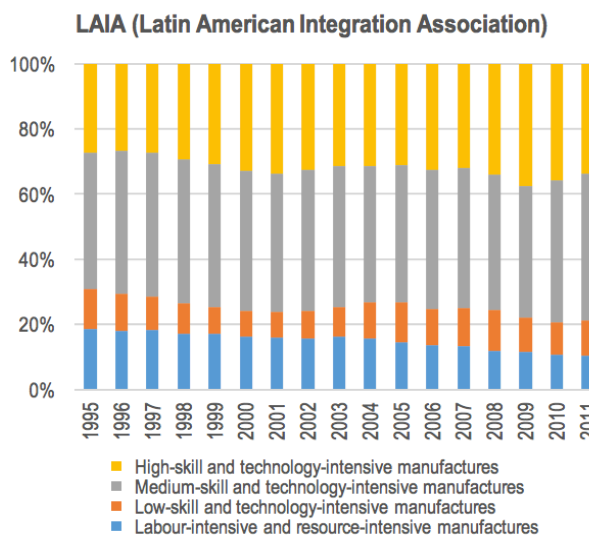
LAIA (Latin American Integration Association)

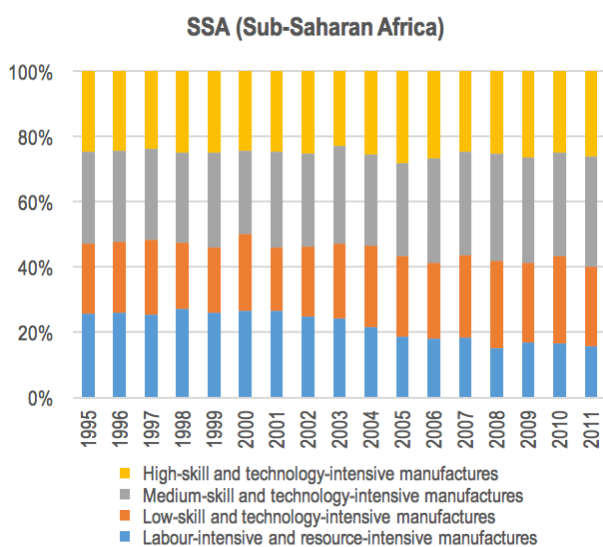- High-skill and technology-intensive manufactures
- Medium-skill and technology-intensive manufactures
- Low-skill and technology-intensive manufactures
- Labour-intensive and resource-intensive manufactures

*Red dots refers to sub-Saharan Africa, green to Asia economies while blue ones to Latin American countries
**We excluded "agriculture and government services".

Apprehending the issue from that perspective and talking about how much manufacturing activities are inclusive in Sub-Saharan Africa can be misleading. According to elasticity analysis, the growth model in the manufacturing sector is more "inclusive" in sub-Saharan Africa than in some Latin America or Asia economies. However, elasticity, as we know does not reflect levels of growth rate, as it combines it with the labor market dynamics. For instance, a country that grew by 1 per cent and witness a 1 per cent increase in employment have a higher employment intensity than a country which enjoys a 10 per cent growth rate, creating 9 per cent increase in employment. Therefore, the manufacturing growth inclusiveness depends

also on a larger extent on its size and development prospects. While elasticity is generally bigger in sub-Saharan Africa, manufacturing value added growth are still low[7].

V. Determinants of Manufacturing and overall Employment Elasticities

This section discusses the estimations results of equation (3) following different specifications. Then, we assess the impact of the same set of variables on overall employment elasticity, excluding manufacturing of course, agriculture and public services. Agriculture will not be a major employer in any country moving forward away from an agrarian economy towards modern sectors. Therefore, the arbitrage holds between manufacturing as a first absorber of rural employment and Services. Administration was not considered while calculating overall employment elasticity. Actually, employment decisions might not obey to objective standard and the private optimizing perspective could be missing. Moreover, this sector is not a long-term employment creator. Even for well-endowed countries with natural resources, commodity price volatility hampers the perception that public employment is a perpetual option for job seekers.

Effects of variables over manufacturing and the rest of the economy elasticities.

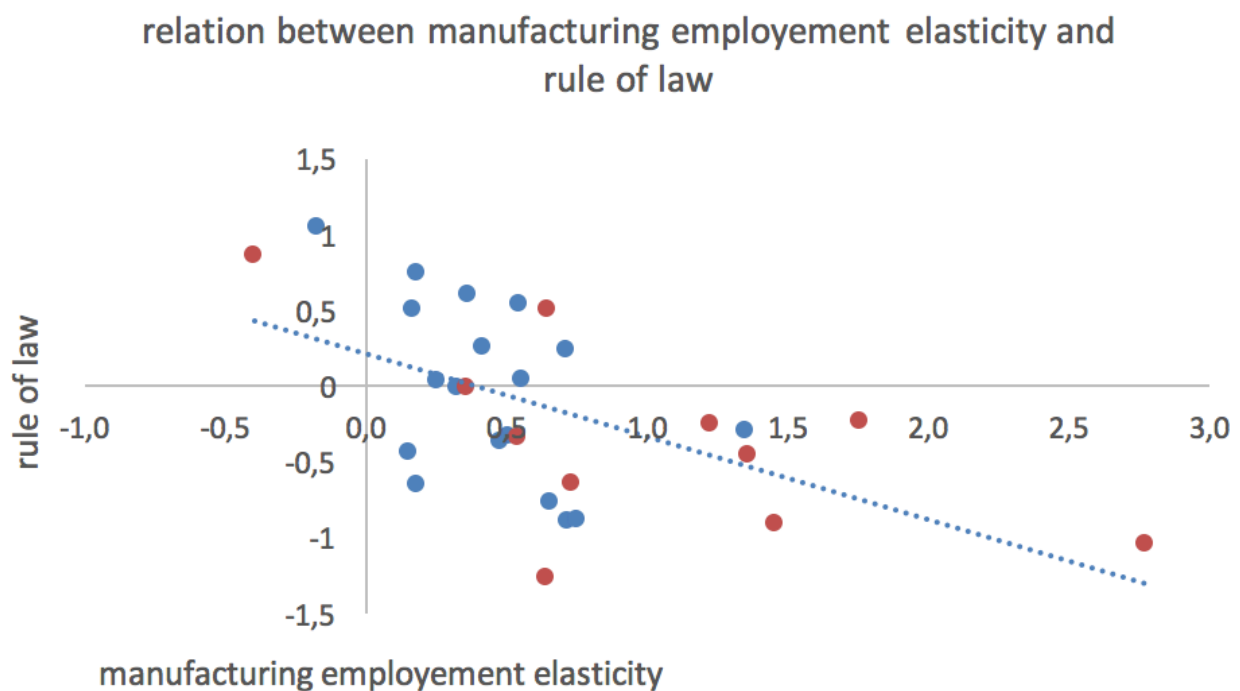| Variables	Manufacturing elasticity						Overall employment elasticity
	I	II	III	IV	V	VI	
Agriculture employment in %	0.015***	0.135***	0.02***	0.016***	0.016***	0.02***	0.015***
Rule of Law	-	-0.37**	-0.26**	-0.4**	-0.37**	-0.35**	0.05
Sectoral Value added growth in %	-	-	-0.07***	-0.1***	-0.1***	-0.11***	-0.08**
Log(Inflation volatility)	-	-	-	-0.1**	-0.07*	-0.12*	-0.04
Collective bargaining	-	-	-	-	0.07**	0.05*	0.07**
Latin America dummy	-	-	-	-	-	0.3*	0.75***
Adjusted R2	0.38	0.49	0.54	0.59	0.57	0.58	0.43

Note: *, **, *** denote significance at 10 percent, 5 percent; and 1 percent, respectively.
Standard errors have been adjusted for the presence of heteroskedasticity by the White approach.

Economic structure: the table above presents different specifications. Starting with agriculture employment, it appears that this variable is relevant to explain cross-country variation. Economies, at a starting point in their structural transformation, exhibiting a high dependence over agriculture sector in terms of employment creation, are prone to develop a more inclusive manufacturing sector, in which growth creates employment. The economic intuition is the following: As the employment stock in agriculture is bigger, manufacturing elasticity increases. The abundance of low skilled labor in a country puts downward pressure over wage and serve as incentive for entrepreneurs and companies to set their business and move toward a light manufacturing model that relies more over labor than capital. Indeed, the three Sab-Saharan countries that have a weaker elasticity in employment to growth in manufacturing compared to overall economy are also the countries with the lowest share of agriculture in total employment. Namely, agriculture employs around 40% of total labor force in Botswana, 21% in South Africa, and 16% in Mauritius in 1990. It's worth mentioning that the indicator by itself explains 38% of variation across the 30 countries,

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7. We will elaborate more on that subject in the next sections.

which is higher than the explanation power of all the rest of variables as it is reported by the other specifications. 10 percentage points increase in agriculture employment, raise manufacturing elasticity by 0.2 percentage point.

Rule of law: economic intuition regarding the effect of rule of law over elasticity is not conclusive. As economic theory suggests, the quality of institution is a crucial determinant of the elasticity of manufacturing. The lack of governance and optimized administrative procedures hampers translating growth into employment. However, the sign of the coefficient is not consistent with the intuition above. According to the model, countries with a better governance framework witness a lower elasticity and vice-versa. Feige (2005), Nastav and Bojnec (2007), Schneider (2007), provide an insight into informal economy activities in developing countries. They, as well as other studies (e.g. (Johnson et al., 1999), (Schneider and Enste, 2002), (OECD, 2002), (Choi and Thum, 2005), (Buehn, 2012), (Buehn et al., 2013), have identified high tax burdens, corruption, administrative barriers, and nonexistent or deficient rule of law as the main causes of the development of the informal economy. Therefore, whenever law enforcement is not effective, the informal sector tends to proliferate[8]..

relation between manufacturing employement elasticity and rule of law

Red dots refers to sub-Saharan Africa

As well-known, the informal sector works as a buffer in bad times and allows swift and free adjustment of labor to demand shocks affecting the activity. This is why, responsiveness of employment to output is higher when quality of governance is lower (informal sector is bigger). The argument of informality is relevant with regard to the process of economic development. Indeed, many studies show that high rates of informality are associated with low economic development.

Sectoral value added growth: this variable captures possible non-linear effect on elasticity, indicating that observed elasticity for low growth rate is different compared to elasticity for sustained and relatively

8. Andrews, D., Sánchez, A.C. and Johansson, Å. (2011), "Towards A Better Understanding of the Informal Economy", OECD Economics Department, Working Papers No. 873.

high growth rates. For each increase in manufacturing growth rates of 1 percentage point, elasticity decreases by 0.1 in almost all the specifications. As mentioned before, this demonstrates that countries that are witnessing a higher employment elasticity are in fact those who are not growing fast. In sub-Saharan Africa, manufacturing performance is deceiving, as few countries were able to grow at rates beyond 4% in the period 1990-2011. Countries that were capable of sustaining growth are not exhibiting the highest employment intensity. One way to apprehend it is the possible trade-off between growth rate and employment intensity. Actually, in order to increase your growth rate especially in manufacturing, this latter should move towards a less "inclusive model" that relies over the integration of technological processes and the capitalization of the sector, at the expense of labor.

Figure (5) demonstrates that countries that are witnessing a higher employment elasticity are in fact those who are not growing faster. In sub-Saharan Africa, manufacturing performance is deceiving, as few countries were able to grow at rates beyond 4%. Countries that were capable of realizing a sustained manufacturing growth are not exhibiting the highest employment intensity. One way to apprehend it is the possible trade-off between growth rate and employment intensity. Actually, in order to increase the growth rate especially in manufacturing, the manufacturing sector should move towards a less "inclusive model" that relies over the integration of technological processes and the capitalization of the sector, at the expense of labor. The case of China is inspiring in this situation, with one of the lowest elasticity in our sample (0.1[9]), this economy could achieve a growth rate of 13% in average. Growth is thus driven mainly by capital and/or TFP (Brandt, Van Biesebroeck and Zhang (2012)) and lead to relative substitution between labor and factors of production (Wang, Cai and Lin (2007)).

Figure 5: Elasticity and growth rate in the manufacturing sector*
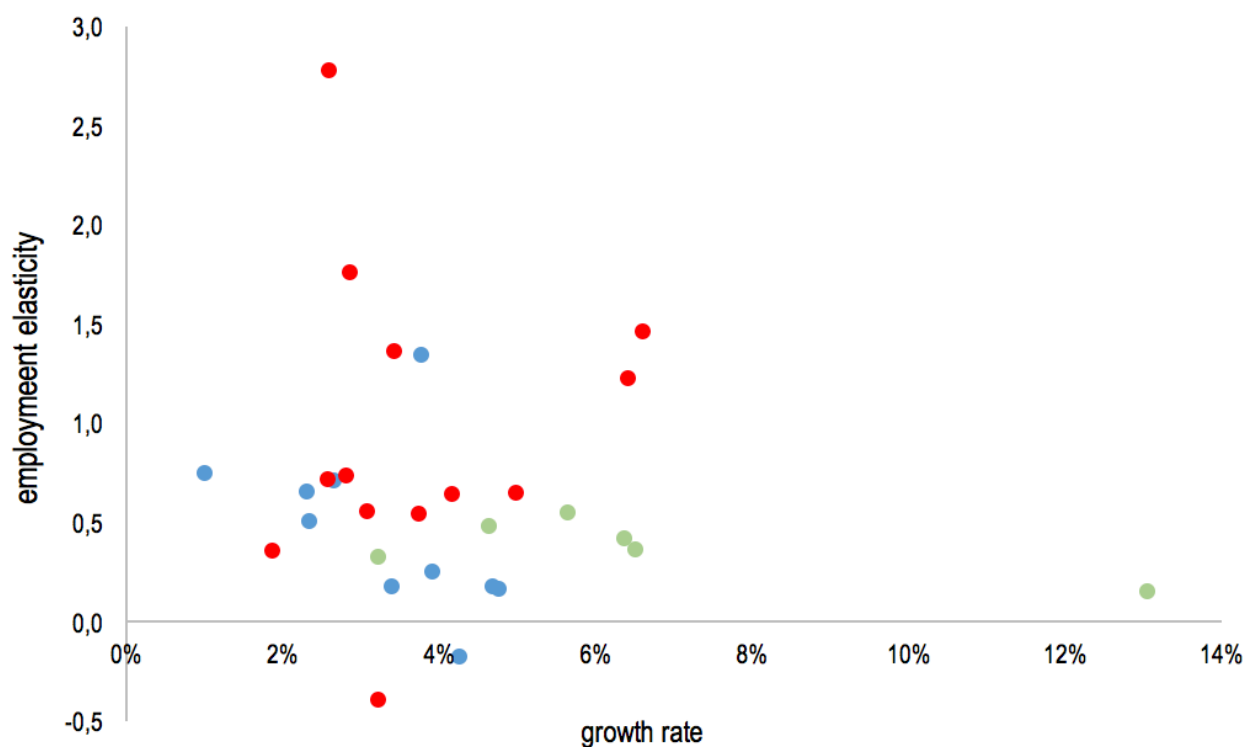
*Red dots refers to sub-Saharan Africa, green to Asia economies while blue ones to Latin American countries
**We excluded "agriculture and government services".

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9. This is consistent with IMF estimates "China's Labor Market in the "New Normal" (2015) and ILO "Key Indicators of the Labour Market" (KILM) (2007).

In sub-Saharan Africa, two countries are outperforming their peers. Ethiopia and Tanzania, with growth rates in the manufacturing sector around 6.6% and 6.4% on average between 1990 and 2011, and were able to insure a high inclusive growth with elasticities that are above unity. Particularly in Ethiopia, the Growth and Transformation Plan (GTP) that provides the medium-term strategic framework aiming to accelerate GDP growth and employment, bets deeply on the manufacturing sector and its ability to industrialize the economy and to increase its per capita GDP to middle-income levels by 2025. Subsequently, policy makers have promoted different instruments to foster Ethiopia's attraction to foreign investors and to support SMEs competitiveness (World Bank (2015)). Yet, World Bank assessment consider manufacturing performance insufficient to trigger a structural transformation able to pull labor out of the agriculture sector that employs over 77%. Actually, the share of the manufacturing in GDP remained slightly above 4 percent for the past decade. The share of employment in the manufacturing sector did increase but at a slower pace, providing around 5 percent of total employment. Overall, the objective of the African economies to make their manufacturing sector an "engine of growth" is, we assume, contingent on their capacity to sustain their growth rates, which comes at the expense of labor demand and the need to switch their growth model into an intensive one where contribution of labor to wealth creation is lower.

Inflation volatility: considered generally as a measure of visibility for investors and economic operators in general, whenever there is an increase in inflation volatility investments decisions and haring behavior are encountered with uncertainty. Translating growth into a hiring decision is also affected by the lack of visibility for companies. With a coefficient consistent with economic theory and statistically significant, an increase in volatility by 10%, reduces manufacturing elasticity by 1%.

Collective bargaining: As expected and following the results of Kapsos (2005), Mourre (2004) and Döpke (2001), in an economy w here collective bargaining is well enforced, employment do not adjust to demand shocks affecting output growth. This measure captures the relative flexibility in the labor market and informs on the capacity of companies to adjust their labor demand to output shocks. The collective bargaining behavior raises the cost of labor and tends to depress hiring decisions when economic conditions are relatively favorable. The process of collective bargaining has, thus, the potential to inhibit employment while it has been set up initially to promote job opportunities. Note that bargaining reforms, introduced in the early 1990s, in Latin America at the industrial level made the negotiations based on productivity. This can, in part, explain the low level of manufacturing elasticities in the Latin American set of countries (Lamarche, 2015)

Is there any divergence between drivers of manufacturing elasticity and the rest of the economy?

The last column of the table presents estimations results of the determinants of overall employment elasticity, given the same set of explanatory variables. Starting with agriculture employment, elasticity is positively correlated to the "agriculture labor stock" as it is the case also for manufacturing. The difference in this case is the scale of the impact. The coefficient in manufacturing is bigger than the rest of the economy. Therefore, the agriculture shares of employment impact the growth model more in manufacturing than in the rest of the economy. Of course, both sectors are prone to benefit from the abundance of rural labor to set intensive labor activities, however, manufacturing is the one to establish a business model in which growth creates more employment.

If agriculture employment also affects overall employment elasticity but at a lower extent, rule of law seems not to influence elasticity, as it is the case in manufacturing. As we stressed out above, rule of law is

capturing the effect of prevalence of informal sector within an economy. The lack of detailed data regarding the distribution of informality across sectors in sub-Saharan Africa and developing countries in general do not allow concluding over the high possible prevalence of informal activities within the manufacturing sector and thus the difference between manufacturing elasticity, on the one hand, and overall elasticity on the other. We suggest, however, that the tradability characteristic of this sector exert pressure over the rapid and the necessary adjustment of labor-to-demand shocks, making the companies more willing to translate growth into employment in the manufacturing sector, than in the rest of the economy. Moreover, it is possible that for the rest of the economy the "governance effect" dominate the "informality effect", suggesting that better governance in services might serve more the translation of growth into employment than in manufacturing.

Regarding the non-linear effect, it seems that elasticity at lower growth rates is bigger than elasticity at higher rates, even for the rest of the economy. However, the extent is lower. This could be explained by the possible scale economies in the manufacturing sector that outperform the rest of the economy. The automatization process and the substitution effect is more likely to occur in manufacturing than in services, especially considering that the above analysis has been conducted mainly over developing economies, in which services do not witness high productivity level and thus, low levels of scale economies.

According to the coefficient related to inflation volatility, elasticity in the rest of the economy is negatively affected by the uncertainty prevailing in the economy. While the sign of the coefficient is consistent with economic theory, nevertheless it is not statically significant. This time again, the tradability feature of the manufacturing products might be more binding than the services. Therefore, volatility tends to inhibit hiring decisions and translating growth into employment.

Rigidity in the labor market approximated through the collective bargaining behavior is affecting the employment elasticity, following the empirical literature, with a coefficient slightly higher compared to manufacturing elasticity. As a result, labor market regulation is a relevant instrument for policy makers to increase employment responsiveness to economic growth, in manufacturing but also in the rest of the economy.

Regarding the dummy variable, it appears that countries from Latin America are systematically witnessing a higher employment elasticity, once we control for economic structure and labor regulation, rule of law and levels of growth. In Latin America, ceteris paribus, elasticity is greater by 0.75, which means that growth in this region creates much more employment than it does in sub-Saharan Africa and Asia.

Conclusions and policy implications

The aim of this work is to contribute to the empirical literature on employment-GDP elasticities in four main ways. First, it provides a set of employment-GDP elasticities for a sample of emerging and developing economies, including 11 sub-Saharan countries, based on GGDC 10-sectors database. Second, it assesses the extent to which manufacturing activities are inclusive compared to the rest of the economy, in terms of employment creation. Third, it explores the determinants of cross-country variations in employment elasticities, both on overall and manufacturing levels, focusing in particular on the role played by structural, institutional, and macroeconomic variables. Fourth, the present paper attempts to measure the difference in the manufacturing elasticity responsiveness to the same set of explanatory variables compared to the overall employment elasticity.

The key results of the paper can be summarized as follows: (i) Overall point estimates of elasticities typically fall in the 0–1 range, with the majority of them ranging between 0.4 and 0.7. (ii) Elasticities vary considerably across countries and sectors, with manufacturing elasticity outperforming the rest of the economy in low-income countries in sub-Saharan Africa, while it's below average in Latin American and Asian economies. (iii) Structural policies aimed at increasing labor market flexibility and accelerating the process of structural transformation have the same significant and positive impact on both overall and manufacturing employment elasticities. (iv) Macroeconomic policies aimed at reducing macroeconomic volatility have a significant and positive impact on manufacturing elasticity rather than the rest of the economy. We attribute that to the tradability characteristic of manufacturing products that exert pressure over the competitiveness of the domestic fabric and thus the scale of growth translation into employment. (v) Manufacturing activities tends to be more labor-intensive than the rest of the economy when agriculture employment is higher, suggesting that the "stock of unskilled labor in agriculture" feed growth in manufacturing more than the rest of the economy; (vi) The rule of law is a crucial determinant of how much growth is translated into employment. However, the sign of the coefficient is not consistent with the prevailing intuition. Countries with a better governance framework witness a lower elasticity and vice-versa. We argued that rule of law could be capturing the effect of informal sector that may allow more flexibility within labor markets. This channel seems to be effective in the manufacturing activities. (vii) Finally, it seems that elasticity at lower growth rates is bigger than elasticity at higher rates, even for the rest of the economy. However, its extent in overall economy is lower than manufacturing. This could be explained by the possible scale economies in the manufacturing sector that outperform the rest of the economy. The automatization process and the substitution effect is more likely to occur in manufacturing than in services, especially if consider that the above analysis has been conducted mainly over developing economies, in which services do not witness high productivity level and thus, low levels of cost-cuts.

Regarding implications over sub-Saharan African industrial policies, the paper has confirmed that the manufacturing sector's capacity to absorb the extra labor supply drawn from the agriculture sector is effective. However, elasticity, as we know it, does not reflect levels of growth rate, as it combines it with the labor market dynamics. For instance, a country that grew by 1 per cent and witnesses a 1 per cent increase in employment has a higher employment intensity than a country which enjoys a 10 per cent growth rate, creating 9 per cent increase in employment. Therefore, the manufacturing growth inclusiveness depends on a larger extent on its size and development prospects. Indeed, manufacturing growth in sub-Saharan Africa is lower compared to the performance of other countries. Overcoming the de-industrialization issue and accelerating growth in the sector could be achieved through increased use of capital and technology, which as the paper demonstrated, comes at the expense of labor. Thus, mass

employment creation per unit growth is not adequate for countries driven by the ambition to accelerate their industrialization. Productivity gains are crucial for insuring competitiveness and guarantee long-term growth of the domestic productive fabric.

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Annexes

Botswana	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Agriculture	4,0	2,5	2,8	40,2	38,3	38,1	10,1	6,5	7,4
Industries	57,7	49,0	35,8	22,3	18,8	11,7	258,7	261,3	304,6
Mines	40,6	33,2	18,6	3,3	2,4	2,0	1238,4	1359,8	944,0
Manufacturing	6,9	7,4	8,0	5,8	6,4	6,5	119,7	114,8	123,8
Other Industries	10,1	8,4	9,2	13,2	9,9	3,3	76,4	85,2	278,9
Services	38,3	48,5	61,4	37,5	42,9	50,2	102,0	113,0	122,4
Markets Services	20,3	28,4	38,2	13,5	18,0	29,4	149,7	157,8	130,1
Distribution	14,1	18,0	26,5	9,8	13,2	22,4	143,3	137,2	118,4
Finances	6,2	10,3	11,7	3,7	4,8	7,0	166,5	213,8	167,4
Non-Markets Services	18,0	20,1	23,1	24,0	24,9	20,8	75,1	80,6	111,5
Administration Services	13,4	15,4	15,0	14,4	19,8	16,8	93,5	78,1	89,2
Other services	4,6	4,7	8,1	9,6	5,2	3,9	47,6	90,5	207,2

Ethiopie	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Agriculture	63,3	49,0	42,4	89,4	84,9	75,1	70,8	57,7	56,4
Industries	10,9	12,3	13,3	2,2	4,0	8,8	488,7	308,3	150,1
Mines	0,3	0,5	0,6	0,1	0,2	0,5	265,7	215,7	119,1
Manufacturing	4,6	5,6	5,2	1,8	3,1	6,2	259,0	177,6	82,8
Other Industries	6,0	6,2	7,5	0,3	0,6	2,1	1763,6	1034,6	355,0
Services	25,8	38,7	44,4	8,3	11,1	16,0	309,8	349,3	276,9
Markets Services	19,4	23,4	30,5	4,2	5,2	11,2	468,4	445,7	273,1
Distribution	16,8	19,2	24,4	4,1	5,1	10,7	413,5	375,9	227,7
Finances	2,7	4,2	6,1	0,1	0,1	0,4	2832,7	2834,5	1375,1
Non-Markets Services	6,4	15,3	13,9	4,2	5,8	4,9	152,2	262,7	285,9
Administration Services	4,4	12,0	11,0	2,1	3,2	2,5	212,7	371,8	442,1
Other services	1,9	3,4	2,9	2,1	2,6	2,4	92,4	128,2	120,9

Ghana	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Agriculture	31,2	32,9	29,5	53,5	53,6	41,6	58,3	61,4	70,9
Industries	23,6	21,1	22,3	15,9	15,7	15,4	148,6	134,9	145,2
Mines	3,0	2,8	2,9	0,9	1,8	1,1	324,5	158,9	266,3
Manufacturing	12,8	11,1	8,8	12,9	10,6	10,8	99,0	104,4	81,3
Other Industries	7,8	7,2	10,6	2,0	3,3	3,5	382,7	220,5	306,1
Services	45,2	45,9	48,2	30,6	30,7	43,1	147,7	149,7	112,0
Markets Services	30,2	32,5	34,0	20,5	21,4	30,2	147,2	152,1	112,7
Distribution	25,7	26,7	28,1	19,8	19,9	27,9	130,3	133,9	101,0
Finances	4,4	5,8	5,9	0,7	1,4	2,3	595,2	403,9	254,6
Non-Markets Services	15,0	13,5	14,2	10,1	9,3	12,9	148,7	144,0	110,1
Administration Services	10,8	9,4	10,0	5,8	5,2	6,6	183,9	180,5	151,5
Other services	4,3	4,0	4,2	4,3	4,1	6,3	100,3	98,0	66,7

Kenya	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	**2000**	**2010**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Agriculture	**30,0**	**28,1**	**23,8**	**71,2**	**56,1**	**48,3**	**42,2**	**50,1**	**49,4**
Industries	**21,8**	**19,3**	**20,2**	**7,2**	**13,1**	**16,4**	**304,4**	**147,0**	**123,5**
Mines	0,6	0,6	0,6	0,1	0,5	0,6	832,0	114,0	92,9
Manufacturing	13,3	12,2	12,1	5,3	10,0	12,8	248,7	121,5	94,7
Other Industries	7,9	6,5	7,6	1,7	2,6	3,0	453,4	251,7	251,5
Services	**48,2**	**52,6**	**55,9**	**21,6**	**30,8**	**35,3**	**222,8**	**170,8**	**158,4**
Markets Services	25,0	29,6	36,4	10,9	17,5	21,1	230,3	168,8	172,6
Distribution	20,6	21,3	28,3	9,9	15,9	19,9	207,7	134,3	142,4
Finances	4,5	8,2	8,1	1,0	1,6	1,2	463,3	501,5	666,1
Non-Markets Services	23,2	23,0	19,5	10,8	13,3	14,2	215,1	173,5	137,3
Administration Services	18,8	18,0	15,0	5,4	6,5	6,1	348,7	277,4	248,3
Other services	4,4	5,0	4,5	5,4	6,8	8,2	81,6	74,0	55,0

Malawi	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	**2000**	**2010**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Agriculture	**24,5**	**38,5**	**29,9**	**86,1**	**82,3**	**65,2**	**28,5**	**46,8**	**45,9**
Industries	**18,7**	**16,2**	**20,8**	**4,9**	**4,8**	**9,4**	**383,0**	**336,5**	**220,9**
Mines	0,9	0,8	3,1	0,2	0,0	0,1	609,2	1642,3	2495,3
Manufacturing	11,9	9,6	10,4	3,0	2,7	4,4	398,0	357,5	235,2
Other Industries	5,9	5,9	7,3	1,8	2,1	4,9	337,7	279,3	149,6
Services	**56,7**	**45,2**	**49,3**	**9,0**	**12,8**	**25,4**	**629,7**	**352,4**	**194,1**
Markets Services	33,9	29,5	36,7	4,6	7,5	16,0	736,9	395,1	229,8
Distribution	26,9	22,0	28,3	4,1	6,8	15,2	652,1	325,2	185,9
Finances	7,0	7,5	8,4	0,5	0,7	0,7	1464,6	1075,0	1148,9
Non-Markets Services	22,8	15,8	12,6	4,4	5,4	9,4	517,7	293,3	133,6
Administration Services	17,7	11,5	8,0	3,3	4,5	7,2	534,5	258,4	110,6
Other services	5,1	4,3	4,7	1,1	0,9	2,3	466,4	460,9	207,0

Mauritius	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	**2000**	**2010**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Agriculture	**12,0**	**7,4**	**5,2**	**16,7**	**11,4**	**7,2**	**71,6**	**64,6**	**72,3**
Industries	**34,9**	**33,1**	**28,3**	**43,2**	**39,3**	**30,3**	**80,8**	**84,3**	**93,3**
Mines	2,2	1,7	0,4	0,2	0,3	0,2	1375,6	587,6	199,5
Manufacturing	25,4	23,7	18,8	32,2	28,8	19,1	78,8	82,2	98,3
Other Industries	7,3	7,7	9,1	10,9	10,2	11,0	67,3	75,8	82,8
Services	**53,1**	**59,5**	**66,6**	**40,1**	**49,3**	**62,6**	**132,5**	**120,7**	**106,4**
Markets Services	36,0	42,2	47,6	20,0	28,9	39,3	180,2	146,1	121,2
Distribution	29,5	31,3	36,0	17,1	24,3	29,8	172,5	128,8	120,9
Finances	6,4	10,9	11,7	2,8	4,6	9,5	226,8	237,2	122,1
Non-Markets Services	17,1	17,3	18,9	20,1	20,4	23,2	85,1	84,8	81,5
Administration Services	15,0	14,1	14,6	11,8	14,4	16,5	127,7	97,7	88,6
Other services	2,1	3,2	4,3	8,4	6,0	6,8	25,3	53,4	64,0

Nigeria	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	**2000**	**2010**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Agriculture	**23,2**	**27,9**	**37,7**	**50,0**	**63,7**	**60,7**	**46,3**	**43,8**	**62,1**
Industries	**61,2**	**55,9**	**35,6**	**6,4**	**4,2**	**6,2**	**961,4**	**1346,0**	**569,7**
Mines	55,9	50,9	29,7	0,4	0,1	0,2	14319,9	71470,7	12824,6
Manufacturing	3,8	3,1	3,5	4,4	3,1	4,2	84,9	98,4	84,8
Other Industries	1,5	1,9	2,3	1,5	1,0	1,8	100,7	196,4	125,7
Services	**15,6**	**16,2**	**26,7**	**43,6**	**32,2**	**33,1**	**35,8**	**50,5**	**80,8**
Markets Services	14,0	14,1	24,4	30,9	21,7	22,7	45,4	65,1	107,5
Distribution	12,1	12,5	22,2	30,1	21,0	20,0	40,2	59,5	111,1
Finances	1,9	1,6	2,2	0,8	0,6	2,8	240,4	250,7	81,1
Non-Markets Services	1,6	2,1	2,3	12,7	10,5	10,4	12,5	20,4	22,3
Administration Services	1,2	1,2	1,1	6,3	4,2	4,3	19,2	29,1	26,1
Other services	0,4	0,9	1,2	6,4	6,3	6,1	6,1	14,7	19,6

Senegal	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	**2000**	**2010**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Agriculture	**20,9**	**20,9**	**17,7**	**65,8**	**58,2**	**51,4**	**31,8**	**35,8**	**34,3**
Industries	**22,8**	**24,6**	**23,8**	**8,2**	**11,1**	**13,9**	**279,2**	**222,0**	**170,6**
Mines	1,5	1,4	1,3	0,1	0,1	0,2	1931,7	1105,3	574,9
Manufacturing	16,6	16,5	14,6	5,8	8,0	9,9	284,7	207,2	147,2
Other Industries	4,8	6,7	7,9	2,3	3,0	3,8	210,6	223,5	207,2
Services	**56,2**	**54,5**	**58,6**	**26,0**	**30,7**	**34,6**	**216,1**	**177,7**	**169,2**
Markets Services	37,2	38,2	43,3	15,9	20,7	25,0	233,9	184,3	173,3
Distribution	30,9	31,1	35,1	15,7	20,3	24,5	197,1	152,7	143,3
Finances	6,3	7,1	8,2	0,2	0,4	0,5	2674,4	1928,9	1607,4
Non-Markets Services	19,0	16,4	15,2	10,1	10,0	9,6	188,1	164,2	158,4
Administration Services	16,6	13,9	13,1	5,1	4,8	5,2	329,7	288,3	252,4
Other services	2,3	2,4	2,2	5,0	5,1	4,4	46,3	47,1	48,8

South Africa	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	**2000**	**2010**	**1990**	**2000**	**2010**	**1990**	**2000**	**2010**
Agriculture	**3,7**	**3,3**	**2,7**	**21,5**	**18,7**	**15,0**	**17,2**	**17,5**	**18,1**
Industries	**39,8**	**35,5**	**30,9**	**30,1**	**22,7**	**21,8**	**132,0**	**156,5**	**141,4**
Mines	11,6	9,3	6,5	8,8	3,5	2,1	132,7	268,1	310,2
Manufacturing	22,3	21,0	18,4	14,7	13,6	11,9	151,8	154,0	154,7
Other Industries	5,8	5,2	6,0	6,7	5,6	7,9	87,5	92,9	76,3
Services	**56,5**	**61,2**	**66,4**	**48,4**	**58,7**	**63,1**	**116,9**	**104,4**	**105,2**
Markets Services	30,3	36,3	43,6	27,5	33,6	36,6	110,3	107,9	119,1
Distribution	21,6	24,9	25,6	22,6	26,1	25,3	95,3	95,5	101,0
Finances	8,8	11,4	18,1	4,9	7,6	11,3	180,3	150,4	159,6
Non-Markets Services	26,2	24,9	22,8	20,9	25,0	26,5	125,5	99,7	85,9
Administration Services	20,6	18,0	16,2	10,7	14,6	15,5	193,4	123,4	104,9
Other services	5,6	6,9	6,5	10,2	10,4	11,0	54,6	66,4	59,3

Tanzania	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Agriculture	36,4	38,4	29,9	86,1	83,5	71,7	42,2	45,9	41,7
Industries	21,8	21,4	26,5	2,7	3,2	5,9	817,2	660,5	451,2
Mines	0,6	2,3	3,3	0,4	0,5	0,8	142,1	448,8	422,0
Manufacturing	7,8	8,9	10,2	1,4	1,7	3,2	570,5	532,6	314,4
Other Industries	13,3	10,2	12,9	0,8	1,1	1,8	1567,0	963,3	705,5
Services	41,9	40,2	43,7	11,3	13,3	22,5	371,8	303,3	194,3
Markets Services	27,4	27,7	30,2	6,5	7,7	12,3	424,6	358,4	244,4
Distribution	21,9	23,1	25,5	6,2	7,5	11,7	352,7	306,7	218,2
Finances	5,5	4,6	4,7	0,2	0,2	0,7	2214,9	2287,4	709,5
Non-Markets Services	14,4	12,6	13,5	4,8	5,5	10,1	300,6	226,6	133,2
Administration Services	13,6	11,6	12,8	3,3	3,5	8,2	407,2	330,7	155,7
Other services	0,9	1,0	0,7	1,5	2,0	1,9	58,5	48,1	35,6

Zambia	Value Added in %			Employment in %			Relative Productivity Ratio in %		
	1990	2000	2010	1990	2000	2010	1990	2000	2010
Agriculture	16,9	23,9	9,4	75,3	71,6	72,2	22,4	33,3	13,0
Industries	40,3	24,5	31,2	8,5	5,8	7,5	474,8	425,8	418,7
Mines	14,0	4,6	13,5	2,6	1,3	2,4	538,4	357,8	553,3
Manufacturing	15,3	11,4	8,7	4,0	2,8	3,3	382,8	413,1	261,6
Other Industries	11,0	8,5	9,0	1,9	1,7	1,7	580,6	498,3	530,4
Services	42,8	51,6	59,4	16,2	22,6	20,3	264,0	228,1	292,7
Markets Services	31,8	40,9	44,1	6,8	9,7	13,6	468,4	421,2	323,0
Distribution	26,7	30,0	35,3	5,2	8,7	12,5	514,0	345,7	281,6
Finances	5,0	10,9	8,8	1,6	1,0	1,1	318,7	1052,5	793,8
Non-Markets Services	11,0	10,7	15,3	9,4	12,9	6,6	117,0	82,9	230,5
Administration Services	10,3	10,0	14,3	0,0	0,0	0,0	..	..	..
Other services	0,7	0,8	1,1	9,4	12,9	6,6	7,9	5,9	16,0