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Master in Economic Development and Growth

## Different paths of urbanization: the unconventional case of developing countries

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*Abstract:* Developing countries have undergone a process of rapid urbanization since the 1950s. However, some of them did not follow the “natural” path of urbanization, implying that additional factors also played an important role in the process of urbanization. This thesis examines common drivers of the urbanization process across countries in Asia, Latin America and Sub-Saharan Africa. Thereby, it analyses the role of the two main engines of structural change -i.e. the “labor pull” and the “labor push”, as well as the influence of natural resources. Furthermore, this study examines regional specificities, especially focusing on the process of “premature deindustrialization” after 1990 and the impact of natural resources. The results suggest the “labor pull” to be crucial for urbanization, while indicating that the “labor push” is no longer required to foster higher urbanization rates. Moreover, natural resources emerge as an overall negative influence across regions on urbanization. Finally, the findings point to fundamentally different urbanization processes between the three regions, with especially diverging results for Sub-Saharan Africa.

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# 1. Introduction

Since the 1950s, developing countries have undergone a process of rapid urbanization. Thereby, the number of people living in urban areas has grown from 300 million in 1950 to 3 billion in 2015, constituting an increase from 17% to 50% in relative terms.<sup>1</sup> This is a much faster pace than the one experienced by developed countries throughout their urbanization process. According to Henderson (2010), economic development is the main driver of the urbanization process and therefore closely related to overall urbanization rates. However, recent research has shown that nowadays countries are more urbanized than countries in the past with the same level of development (measured in GDP per capita). For instance, a recent study by Jedwab and Vollrath (2015a) finds that in 2010, countries had 25-30% higher urbanization rates than in 1500 for the same level of development in relative terms. Furthermore, developing countries have urbanized in a different way than the current developed countries. This unconventional way of urbanization has been claimed to bring along negative consequences, such as the emergence of poor mega-cities<sup>2</sup> (Jedwab and Vollrath, 2015b).

According to the two sector model proposed by Lewis (1954), the process of economic development is characterized by the reallocation of productive factors from less to more productive sectors, which is commonly known as the structural transformation. As labor constitutes one of these productive factors, this allocation implies the migration of rural workers (previously employed in agriculture) to urban areas (in order to work in industry or services), which drives overall urbanization levels. There are two main engines behind the process of structural transformation according to the literature on the field: one is the “labor push”, proposed by Schultz (1953), which refers to the improvement of agricultural productivity that allows to generate enough food to release labor to other productive sectors. The second one is called the “labor pull”, which states that the rise in productivity in non-agricultural sectors creates a productivity gap between sectors, incentivizing rural workers to shift to more productive sectors due to the higher expected wages. Since the cleavage agricultural/non-agricultural sectors is strongly attached to rural/urban geography, we can conclude that the process of structural change is one of the main drivers of urbanization.

Hence, when trying to understand the urbanization process in developing countries, it is important to also look at their particular development pattern, as not all countries followed the same path throughout their structural transformation. For instance, as stated within the associated literature, Sub-Saharan Africa (SSA) and Latin America (LA), in the end of the 80’s and beginning of the 90’s, both suffered from a process of “premature deindustrialization”. Thereby, those countries began to shift from industry and agriculture directly to services before their level of development would recommend (Rodrik, 2016). This deviation from the “natural” path of structural change has some prejudicial

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<sup>1</sup> United Nations (2013).

<sup>2</sup> Poor mega-cities are characterized by high density and large prevalence of slum population according to Jedwab and Vollrath (2015b).

consequences for a country's development as a shift towards services in SSA and LA had negative consequences for its productivity growth (McMillan and Rodrik (2011).

However, there is few empirical research about the effect of structural change on urbanization.<sup>3</sup> Yet, empirical evidence is needed in order to assess the role the two main engines of structural change (labor push and pull) play within the urbanization process. Furthermore, since regions such as SSA and LA are pursuing a structural transformation different from the "natural" one, it is very likely that the alternative path of structural change has had a significant effect on the process of urbanization of those regions. Moreover, empirical evidence has found that other factors have contributed to the urbanization of those regions. One of the most important and debated factors is the impact of natural resources on urbanization. Recent evidence shows that natural resources could increase urbanization rates due to the spending of the obtained revenues on consumer goods produced in cities. This would have been the main driver of urbanization in several countries of SSA (Gollin et al., 2016). However, a contrasting stream of literature rejects these findings and states that countries in SSA were not positively affected from natural resources regarding urbanization (Henderson et al., 2013). Further empirical evidence concerning this issue is needed taking into account the importance and debated effects of natural resources in developing countries.

This thesis intends to shade light on the drivers of the urbanization process, with a special emphasis on the urbanization of developing countries (Asia, SSA and LA) since 1970 until 2010. Thereby, a comprehensive approach is needed in order to understand the dynamics behind urbanization and its implications. However, it is also important to pay attention to the specificities of each region since they might entail very different outcomes. Therefore, my research questions have a dual approach: The first one focuses on establishing common patterns across regions for the whole period, analyzing the role of the labor push and pull had on the overall process of urbanization, while considering possible other drivers, such as natural resources. The second one investigates the different paths of structural change in order to observe the differences in the urbanization process across regions. More specifically, it explores the different impact of industry and services on the urbanization process of the regions. Special attention will be paid to potential implications of the "premature deindustrialization" that SSA and LA suffered from after 1990. Their development paths will be compared with the "natural" path of structural transformation followed by most Asian countries. Furthermore, the influence of other important drivers such as natural resources will be assessed and it will be observed how much of the urbanization is explained by these drivers.

The results show that overall, the labor pull is significantly important for urbanization in contrast to the labor push, a fact that deserves further investigation. It is also worth highlighting that natural resources have a negative impact on urbanization for the whole sample. Regarding the differences across regions, the results clearly support the hypothesis that Asia followed the "natural" path of structural change, while LA suffered

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<sup>3</sup> The closest approach is by Michaels et al. (2012), who study the relationship between agricultural and non-agricultural sectors and population density, and its effect for urbanization in Brazil and US.

from “premature deindustrialization”. The most striking results emerge for SSA, where a very different way of urbanization independent of natural resources can be observed.

This thesis is structured in five sections and the conclusions. Section 2 provides a review of the existing and relevant literature related to urbanization and its determinants. Section 3 explains the methodological strategy of the study, detailing the specifications that are going to be used. Section 4 shows the data sources, the construction of the variables and some stylized facts of the data. Section 5 explains and discuss the results obtained in the econometric analysis. Section 6 concludes and summarizes the main findings and proposes further research.

## 2. Literature review

Urbanization is very closely related with economic development. According to Henderson (2003), there is a correlation of 0.85 between the rate of urbanization and GDP per capita. However, the relationship between both variables is quite complex according to recent studies. Also the existence and direction of causality is not straight forward. For example, Bloom et al. (2008) observe that urbanization does not cause economic development, while Liddle and Messinis (2015) show that it either coevolves (such in the case of developed countries and Asia) or is decoupled (such in the case of Latin America which has an extraordinary high rate of urbanization). Even though we cannot assert that urbanization causes economic development, most scholars argue that urbanization is a *sine qua non* requirement for economic development (Henderson, 2010). Due to this close relationship, urbanization sometimes is used as a proxy for economic growth when there is scarcity of data (e.g. Bairoch, 1991; Cascio, 2009 and Wilson, 2011 for the Roman Empire; Cascio and Malanima, 2009 for Italian GDP in the long run).

The links between urbanization and economic development have been studied from different approaches. One strand of the literature, drawing from Lucas (1988), is based on the neoclassical theory of growth, which explains that cities are the main engines of growth for the economy. This is because cities are places densely populated where people interact among each other, exchange knowledge, have positive spillover effects and foster innovation. Moreover, population and industry agglomeration allows to have localized information, lower cost due to short distances between customers and suppliers, taking advantage of related industries' spillovers and promoting economies of scale (Black and Henderson, 1999). Another important point is the accumulation of human capital due to the high density of educated people and the exchange of knowledge, which helps to improve productivity. For example, Moretti (2004) shows empirical evidence for manufacturing plants in the US, where an increase in the educational level of the workers fosters productivity levels of the plant due to human capital spillovers. Furthermore, the author finds that industries closely related in economic terms (producing similar goods) benefit more from knowledge spillovers than more distant industries. Hence, for this approach, external scale economies and knowledge spillovers concentrated in cities foster the returns of private human capital accumulation and drive endogenous growth.

However, in this thesis we are going to look closer into another strand of literature, which is mainly based upon the two sector model by Lewis (1954) and theory concerning the new economic geography, mainly developed by Krugman (1991). The two sector model was firstly designed by Lewis (1954) in order to explain the transition from agriculture to industry and had a seminal importance within the field of development economics. This approach is based on the idea that a technology change or productivity difference leads to a re-allocation of resources (capital and/or labor) from the agricultural sector or a peripheral region to a manufacturing sector or a core region. Consequently, the shift of resources provokes the concentration of capital and labor in urban areas that will increase along the development of the country, until it reaches a point where the resources are efficiently allocated. Hence, this approach allows me to study the relationship between



the process of urbanization and the allocation of resources in different sectors within developing countries.

## 2.1 Structural change and urbanization

The major shift in history regarding urbanization came with the rise of the Industrial Revolution. Before that, large parts of the population lived mostly in rural areas, working in agriculture. As Bairoch (1991) shows, in 1500, the most developed and urbanized countries in the world such as Italy or the Netherlands only had 20% of their population living in urban areas. However, after the Industrial Revolution along with the economic development, the rates of urbanization grew very rapidly. This is because the process – i.e. structural change- that triggers economic development also fosters urbanization. In the first stages of development, it usually involves the allocation of workers from agriculture to industry, which implies migration from rural to urban areas (Alvarez-Cuadrado and Poschke, 2011).

Hence, two main engines of structural change can be identified: one is the “labor push” which refers to the improvement of agricultural productivity, allowing to produce enough food to release labor to more productive sectors. Schultz (1953) is the pioneer to formalize this view, but there are many contributions along the same lines (see Gollin et al., 2002, 2007). The second one is the “labor pull”, which states that the emergence of non-agricultural sectors (like industry) with higher productivity than agriculture attracts labor from rural areas due to higher wages. This approach follows the two sector model proposed by Lewis (1954) explained before. Other authors, such as Harris and Todaro (1970), Hansen and Prescott (2002), Lucas (2004) or Gylfason and Zoega (2006) draw from his model to create new models in the same direction.

Although the topic is not new, there is still much debate in the academia regarding the importance of each engine of growth. Rostow (1960) already argued that an increase in agricultural productivity is a *sine qua non* requirement for economic development and other scholars as Ngai and Pissarides (2007) also identify agricultural productivity as the main driver of structural change. On the other hand, Hansen and Prescott (2002) argue that if the improvement in non- agricultural sectors is sufficiently high and is translated to wages, it is enough to trigger structural change. Furthermore, Alvarez-Cuadrado and Poschke (2011) show empirical evidence that although both channels are important, the “labor pull” dominated during most part of the history.

Hence, it is expected that if those channels drive structural change, they would simultaneously drive urbanization, as the two sector models predict. Some studies on this relationship are for example conducted by Nunn and Qian (2011), who investigate how the appearance of potatoes in Europe was an important driver of the increase in population and urbanization through the improvement in agricultural productivity. Michaels et al. (2012) study the urbanization in the US during the XX. century and in Brazil over last four decades in order to observe how the evolution of population growth and density is related to the development of agricultural and non-agricultural sectors and simultaneously affects urbanization. They obtain that at lower population densities (rural areas), where

agricultural employment is predominant, there is a decreasing positive relationship between population growth and initial population density. However, in places with higher population densities, that are more intensively employed in other sectors, an increase in the share of non-agricultural employment usually leads to an increase of population density and growth and thus, the rate of urbanization.

Hence, knowing that the process of structural change is fundamental for urbanization, it is important to consider its evolution in developing countries during the last decades. Dasgupta and Singh (2007) were the first who used the term “premature deindustrialization” to refer to the fact that some countries, especially in Latin America and Sub-Saharan Africa, began to abandon industrial policies and import substitution strategies during the 80’s and 90’s when following the guidelines of the Washington Consensus and focusing on their current comparative advantages. That led to a shrink of manufacturing sectors, shifting people to services. In this context Rodrik (2016) finds that LA and SSA countries began to shift from manufacturing to services way before their levels of development would have predicted. This can be very harmful for those countries because the industry is the main elevator of productivity. Firstly, because the manufacturing sector can yield higher productivity levels with low skilled workers than the other sectors, and secondly as the improvement of workers’ skills is reflected in the improvement of productivity. This allows that the development of the labor force is translated into economic growth. Although other sectors like services also have high productivity jobs, they require a high skilled labor force which at low levels of development is not hardly achievable. McMillan and Rodrik (2011) provide evidence that the shift from manufacturing to services in LA and SSA resulted in a decrease of productivity growth and hence a negative contribution of structural change to economic growth. However, East Asian countries following their export-oriented industrialization continued to improve their productivity levels and built a strong manufacturing sector. Hence, most developing countries in LA and SSA experienced low growth rates during the 90’s and the beginning of the new millennium mainly due to capital inflows and the commodity boom. However, these are very instable sources of growth that rise concerns about their future development. Thus, the deviation from the “natural” path of structural change might have had influence for the urbanization process resulting in a different urban distribution.

## 2.2 Urbanization without growth

Another strand of the literature has focused on the fact that many developing countries are becoming more urbanized without showing an improvement in economic development. Jedwab and Vollrath (2015a) find that for the same level of development in GDP per capita terms, in 2010 countries have 25-30% higher urbanization rates than it was the case in 1500. This implies that urbanization is not always correlated with economic development, and that there are other determinants that foster the development of urban areas. Fay and Opal (2000) investigate this fact and find that in developing countries (particularly in SSA) even in periods with negative economic growth the urbanization process continues due to other factors that incentivize people to migrate to

cities. Some examples are rural-urban wage differentials, ethnic tensions, civil disturbances or better education. Hence, in general cities provide a lot of services that increase the utility of living there and also governments usually carry out urban biased policies that boost that advantage (Henderson, 1982; Ades and Glaeser, 1995; Davis and Henderson, 2003 and Da Mata et al., 2007). Moreover, a consequence of the urban bias through better living standards is that differences in child mortality and death rates between urban areas and rural areas accelerate the process of urbanization. As Jedwab et al. (2015) show, this is particularly important in developing countries, where the living standard gap is bigger.

Other factors such as environmental issues can also affect and influence the life of people, especially those who are more vulnerable. Barrios et al. (2006) investigate if climate change has driven urbanization in developing countries because they are the most vulnerable to climate shocks. The authors find that shortages in rainfall fostered the urbanization process in SSA, especially after achieving independence from the colonial powers due to the abolition of the prohibition to migrate. Following those results, Henderson et al. (2017) also obtain that climate change has a positive impact on urbanization in SSA. However, the impact is concentrated in cities that produce tradable goods (industry and some services). The mechanism is the following: when there is a climate shock, if the city of the region exports goods to other places, its demand is not affected by the shock and the decreasing agricultural incomes incentivize rural workers to migrate to the city. However, if the city does not export, the decreasing agricultural incomes due to the climate shock will decrease also the demanded goods from the city and the urban incomes will also decrease.

Acknowledging the importance of having a strong export profile in order to avoid the local economic instability and environmental shocks, some developing countries have found in natural resources an easy way to earn money. However, these countries have the risk to be affected by the “Dutch disease”, which implies that the increase in revenue through the export of natural resources has a negative impact on the employment in other tradable sectors that are displaced to non-tradable services (Corden and Neary, 1982; Rajan and Subramanian, 2011; Harding and Venables, 2016). This is especially harming to developing countries because it prevents industrialization, which is the main escalator from agriculture to more productive sectors. Furthermore, this disease is especially harming to developing countries, which are due to its weaker institutions more prone to rent-seeking behavior (Gylfason, 2001).

Those dynamics that alter the process of structural change also have consequences for urbanization. However, given that there are several implications, it is difficult to extract clear conclusions. In fact, there is an on-going debate in the academia about the influence of natural resources on urbanization. Gollin et al. (2016) design a model in order to explain the mechanisms behind the urbanization through natural resources exports. They argue that usually cities go through a process of industrialization that allows to produce better goods and improve productivity, which increases wages and attract rural workers (i.e. production cities), and Asian countries would be the perfect example for that kind of

urbanization. However, if a developing country has enough revenues, there will be a displacement of workers from tradable sectors to non-tradable sectors, such as retail or construction, as the models of the “Dutch disease” predicts. These cities are called “consumption cities” because they spend the incoming revenue from natural resources in importing goods from other countries or buying local services. Hence, the development of non-tradable sectors would also attract rural workers because although the productivity is lower than in tradable sectors, wages are still higher than in the countryside. The authors obtain empirical evidence that this is the case of SSA countries, which took advantage of their natural resources endowment in order to increase their revenue. This result is in line with the study of Jedwab (2013) who examines the impact of cocoa during the last century in the urbanization process of Ghana and the Ivory Coast. He obtains that there is a positive relationship between cocoa exports and urban population growth in the areas where cocoa is produced. Furthermore, he also shows that cities situated in those areas have an expansion of non-tradable services, with few improvements in manufacturing, i.e.- those cities become “consumption cities”.

However, Henderson et al. (2013) challenge the conclusions of that strand of the literature, arguing that neither SSA countries have urbanized without growth, nor that natural resources exports have a positive impact on urbanization. Rather, they obtain empirical results that positive agricultural shocks in Africa affect urbanization negatively, and argue that it might be due to the concentrated ownership structure of land. Moreover, they explain that one fundamental difference with the rest of the developing countries is the lack of positive response to improvements in manufacturing in terms of urbanization, probably due to its low level of development.

Taking into account the importance of structural change in the process of urbanization, it is crucial to properly analyze the impact of the last developments regarding structural change in developing countries. Hence, for the research we are going to build on the two sector models applying the dynamics to the process of urbanization, investigating the effects of the two main engines of structural change, i.e. “labor pull” and “labor push”, have on urbanization. However, instead of merging the second and the third sectors, both are considered separately due to the important differences they imply. This is important because there are numerous theories explaining the determinants and dynamics of the process of urbanization, but few empirical evidence testing it. Thus, it would be interesting to observe the general patterns that different regions have in common in order to identify the most important variables regarding urbanization.

Furthermore, a more detailed study of the regions could also yield interesting outcomes. For example, since the process of “premature deindustrialization” in Sub-Saharan Africa and Latin America (explained by Dasgupta and Singh (2007) and Rodrik (2016)) implies a shift from the basic model of structural change, it could have implications for the process of urbanization given the close relationship between the two processes. Specifically, the different development of the countries might have modified the process of urbanization, relying on the service sector as their main driver instead of industry. That could have important implications for the future development prospects of the countries,

since urbanization due to the increase in services employment with low productivity can result in the apparition of slums and increase of urban poverty. Hence, it is interesting to test in how far the urbanization process differed between the three regions, taking into account the differences in terms of structural change. Moreover, it might be also interesting to compare the processes of different regions before 1990 and afterwards, since most scholars placed around that year the beginning of “premature deindustrialization”.

Furthermore, it is relevant to observe the importance of other factors besides structural change. Specifically, this thesis will contribute with additional empirical evidence to the ongoing debate between Henderson et al. (2013) and Gollin et al. (2016) concerning the role of natural resources in the urbanization process of the developing countries. Since Henderson et al. (2013) only focus on Africa and Gollin et al. (2016) have evidence for different regions, we compare the differences and assess possible different explanations.

### 3. Methodology

This thesis focuses on testing the theoretical model that explains the urbanization as a consequence of the process of structural change and examines how differences throughout the development process affect urbanization. For that, an analysis of the evolution of developing countries in Asia, SSA and LA from 1970 to 2010 in terms of urbanization and structural change will be performed. Over this period, these regions have experienced major changes in urbanization, which this thesis tries to relate to developments in their structural transformation. Developed countries, in contrast, had to be excluded from this study as they already have reached a high level of urbanization and the process of structural change has already taken place for the period under consideration. Furthermore, it is also interesting to assess the particularities of the three different regions studied (SSA, LA and Asia) and their evolution before and after the period considered as “premature industrialization” (Taking 1990 as the year that divides the before and after, following Rodrik (2016)). The aim of the study is to observe if there is correlation between urbanization rates and other explanatory variables. The explanation of the possible causation channels relies on the theoretical models since it is very difficult to test for causality in such complex macro scenarios with so many variables affecting the outcome.

For the empirical analysis there is data for 41 years (1970-2010) and 28 countries.<sup>4</sup> In order to carry out the analysis, we follow a similar methodology as Gollin et al. (2016), especially for the choice of control variables. We rely on two different specifications to test my different research questions. Both are similar in terms of the model, but incorporate changes in the explanatory variables and the composition of the sample. A fixed effect panel setting is used for the upcoming estimations, as it allows to observe the evolution within the country for each year of the period between urbanization and productivity or employment share of each sector.

The specification base for the first research question (i.e. investigate the importance of labor push and pull –i.e. agricultural and industrial productivity respectively- and natural resources for urbanization) is the following:

$$U_{c,t} = \alpha_0 + \alpha_1 A_{c,t-1} + \alpha_2 I_{c,t-1} + \alpha_3 S_{c,t-1} + \alpha_4 R_{c,t-1} + \alpha_5 AIGap_{c,t-1} + \alpha_6 ASGap_{c,t-1} + \alpha_7 Pxt + \alpha_8 X_{c,t} + \gamma_t + \delta_t + \mu_{c,t} \quad (1)$$

Where  $U_{c,t}$  is the urbanization rate given as a percentage of a country’s (c) population living in urban areas at a year (t).  $A_{c,t-1}$  is the agricultural productivity of the country in the previous year,  $I_{c,t-1}$  and  $S_{c,t-1}$  the shares for industry and services, respectively. We include the productivities of all the sectors separately although in the theoretical two sector models they are considered together as both sectors have very different characteristics. While industry is the main escalator of productivity, services have a deep

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<sup>4</sup> Further information about data sources and construction of the variables is provided in Section 4.

division between high and low productive jobs.  $R_{c,t-1}$  is a dummy variable that is 1 if the rents from natural resources received by a country are more than 15% of the GDP in the previous year and 0 otherwise, as a proxy for natural resource rich country. This will allow to obtain new empirical evidence about the role of natural resources for urbanization and to compare it with previous research.  $AIgap_{c,t-1}$  is the productivity gap between agriculture and industry and  $ASGap_{c,t-1}$  considers the same gap but between agriculture and services. We introduce this variable as theory suggests that the differences in productivity across sectors might incentivize workers to migrate to more productive sectors because the wage will also be higher as it is assumed. So, it might be that if the gap is larger, the incentive to move to more productive sectors that are mainly located in urban areas is stronger and that would foster urbanization.  $Pxt$  is a specific time trend for each region and  $X_{c,t}$  stands for a set of time varying control variables that might affect urbanization. In that set of variables we include the log of GDP per capita in the previous year to control for the level of development of the country.

Further, we incorporate total population and population growth in that year to control for demographic dynamics because as Jedwab et al. (2015) show, those dynamics have an important influence on urbanization. In particular, the differences in living standards between urban and rural areas leads to higher population growth rates in urban areas, contributing to the increase of urbanization rate, one of the factors provoking the urban bias. We also use rural density (rural population per sq. km of arable land) and droughts in the previous year to control for some “labor push” factors. The land pressure and natural disasters tend to decrease the agricultural output, which results in lower agricultural wages, incentivizing the migration to urban areas where the sectors are more productive and offer higher wages. Furthermore, we include the influence of the political regime with the indicator created by Polity IV. According to Ades and Glaeser (1995), authoritarian regimes tend to have a higher urbanization rate than democratic regimes, another factor of urban bias that influences the process of urbanization. Finally, we use country fixed effects ( $\gamma_t$ ) in order to control for unobservable time invariant characteristics of the country and time fixed effects ( $\delta_t$ ) to control for specific year changes across the sample. In both specifications the robust standard errors are clustered at country level.

In order to deal with the second research question (i.e. the specificities of each region in the urbanization process), we formulate a second, but very similar model. However, we do not use the whole sample, but rather look at each region before and after 1990. Hence, we will perform the analysis for two separated periods in each region: once for the period 1970-1989 and a second time for 1990-2010. Furthermore, we include a general analysis for both periods in order to extract possible common patterns. Therefore, the second specification baseline takes the following form:

$$U_{c,t} = \alpha_0 + \alpha_1 SI_{c,t-1} + \alpha_2 SS_{c,t-1} + \alpha_3 R_{c,t-1} + \alpha_4 Pxt + \alpha_5 X_{c,t} + \gamma_t + \delta_t + \mu_{c,t} \quad (2)$$

We use the employment share of services  $SS_{c,t-1}$  and industry  $SI_{c,t-1}$  for each country (c) in the previous year to observe which sector has been more important for urbanization

in each region. We use the employment share instead of productivity because although the different levels of productivity are what incentivize people to shift from one sector to another, sometimes there are other variables that also influence the decision to move from rural to urban areas and thus, they do not represent the final outcome. However, employment shares show already where people are actually working, which has a more direct impact on urbanization due to the characteristics of the sectors. Hence, employment shares emerge as the most appropriated variable to assess the importance of industry and services in the urbanization process of the countries. We also include the variable rents from natural resources  $R_{c,t-1}$  in order to have additional information of its influence on urbanization and because it allows to compare the results in different regions. Besides that, we use the same time varying control variables as in the previous specification and again, country and time fixed effects.

Yet, the results derived have to be seen with caution. The scope of this study is to show common patterns across countries in terms of urbanization and its correlation with other variables of interest. Since urbanization is such a complex process in which a lot of variables play an important role it is very difficult to isolate the effect of one and even more to show the causality. Furthermore, due to data limitations in earlier years, the studied period does not cover the whole urbanization process of those countries, which began much earlier. This is especially the case for Latin American countries, which had already in the 1970s very high urbanization rates (the mean is almost 60%)<sup>5</sup>. Hence, it can only be analyzed a fraction of the entire period of urbanization which prevents the study from capturing the process as a whole. Moreover, as the countries are at different stages of development, different variables that are driving urbanization at that moment, might have a strong heterogeneity between them. This might make it more difficult to obtain common patterns across countries.

Furthermore, in the first model that is designed to test if the “labor push” or “labor pull” engine has a more significant impact on the process of urbanization, we account for the level of productivity of the sectors and also for the size of the productivity gap between them. However, independently of the size of the productivity gap, the mere existence of the gap is probably a significant driver of urbanization. Nevertheless, we cannot account for it since there is no country in the sample (and probably in the world) that does not have that gap. This means that one of the factors of the “labor pull” would not be taken into account. Thus, we rely on the level of productivity in industry and services and in the productivity gaps to represent the “labor pull” channel.

Finally, despite controlling for population growth and the political regime, two important factors of urban bias, other urban biasing factors might also play a role. We cannot account for the rural urban gap in terms of utilities due to the scarcity of data that implies that in urban areas there might be better living conditions (excluding wage) that could attract rural workers such as better education, safety or sanitarian conditions. This might

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<sup>5</sup> A more detailed overview of the underlying data is performed in the next section.



be especially important in countries in early stages of development where that gap is deeper as those services have not reached rural areas yet.

Hence, it is important to be aware of those limitations when it comes to assess the results of the study. Nevertheless, those limitations do not constitute an unavoidable obstacle for the design of the study.

## 4.Data and stylized facts

For the analysis we have constructed a panel data of 28 developing countries from 1970 to 2010.<sup>6</sup> We have excluded developed countries because they were already very urbanized within the period of time that data is available for and the process of urbanization cannot be observed<sup>7</sup>. We also have to highlight that a few countries are considered developed countries at the end of the period, namely Chile, Korea and Japan. Hence, in the end we have 9 countries from Latin America and the Caribbean, 11 countries from Sub-Saharan Africa and 8 countries from Asia.

We use the GGDC 10-Sector Database<sup>8</sup> by the Groningen University in order to obtain the sectorial labor productivity for each year of the period. This database provides the value added and people employed in 10 sub-sectors of the economy. However, for my purpose it is more adequate to use the three main sector categories, i.e. agriculture, industry and services. Hence, we aggregate the sub-categories following the criteria of Duarte and Restuccia (2010) and Herrendorf et al. (2014):

- Agriculture: Agriculture
- Industry: Composed by manufacturing, mining, construction and public utilities.
- Services: Composed by wholesale and retail trade, transport and communication, finance and business services, community and government services.

Following Diao et al. (2017), we construct the labor productivity of each sector dividing the total value added by the number of people employed in each year. It might not be the ideal measurement because it does not include the number of hours worked and that might bias some sectors that depend significantly on seasonality such as agriculture. However, we rely on the conclusion of Duarte and Restuccia (2010) that obtain that there is almost no difference between the employment share and the number of hours worked. In order to construct the productivity gaps between the individual sectors, we divide the productivity of industry and services by the productivity of agriculture.

Furthermore, we construct the share of employment in each sector, dividing the employed people in each sector by the total number of workers and expressing it as a percentage. This will be useful to explore if the increase of productivity in the sector leads to an expansion in terms of employment or if there is no relation.

We use the World Urbanization Prospects<sup>9</sup> in order to obtain the urbanization rate of each country in each year. It is measured as the percentage of population that lives in urban

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<sup>6</sup> List of the countries available in Appendix A.

<sup>7</sup> We have excluded Hong-Kong and Singapore because they are practically city states with urbanization rates close to 100% and they would distort the results. We also had to drop Taiwan because although there were sectorial data, it has been impossible to obtain the data for the control variables as it does not appear on most of the international organizations such as the World Bank due to its unrecognized status as an independent country.

<sup>8</sup> Constructed by Timmer et al. (2015).

<sup>9</sup> Constructed by United Nations (2014).

areas. From the same data source, we assess the population of each country in each year to account for population growth between the individual years for each country.

We use the World Bank database to obtain some of my control variables, such as GDP per capita in PPP constant 2011 international \$, rural population, and total natural resources rents in percentage of GDP (including oil, natural gas, minerals, coal and forest rents). We also obtain the arable land in square km from the FAO database in order to create the variable rural density by dividing the rural population by the arable land of the country. The number of droughts in each country for each year is extracted from the Emergency Events Database (EM-DAT) created by the Centre for Research on the Epidemiology of Disasters (CRED). Moreover, the status of the political regime of each country is given by the Polity IV Project, Political Regime Characteristics and Transitions Database, which classifies each political regime by an index from -10 (most autocratic) to 10 (most democratic). This project has been created by the Center for Systemic Peace.

Interesting differences across regions emerge when looking at the overall summary statistics of the underlying data. As we can observe in Table 1, there are significant differences across regions in all the variables of interest at the beginning of the period. Observing the urbanization rate it is clear that LA is by far the most urbanized region with a mean of almost 60% and a maximum of 80% for Argentina (more typical for developed countries). Asia has a mean of 32% with a big variance between the most and the least urbanized country (72.6% for Japan and 17.3% for Indonesia). SSA is by far the least urbanized with a mean of almost 25% with all the countries under 50% and Malawi with 6.3%. Also in terms of GDP per capita there are big disparities within and across regions. This is especially the case for Asia, where the poorest country (China) and the richest country (Japan) can be found. In general, the same trends are observed for the employment share in the three sectors, with LA being the most developed region and SSA the least. Furthermore, LA is also the most homogeneous region, with the lowest differences within the region and Asia the most heterogeneous with huge differences between the countries.

Furthermore, the evolution of the regions has been very different. SSA despite beginning the period being the least urbanized region at the beginning the period, SSA simultaneously is the region which with the slowest growing urbanization rate (the mean increase is 15%, in comparison with Asia and LA that have increased their means by 25% and 20% respectively). The same pattern applies for GDP/cap, as SSA is the region where it has increased the least. In Asia, in contrast, where GDP/cap has increased more, urbanization seems to be very correlated with economic development.

Table 4.1. Summary statistics by region in 1971 and 2010

	<b>Year</b>	<b>Asia</b>			<b>Latin America</b>			<b>Sub-Saharan Africa</b>		
<b>Stats</b>		<i>mean</i>	<i>min</i>	<i>max</i>	<i>mean</i>	<i>min</i>	<i>max</i>	<i>mean</i>	<i>min</i>	<i>max</i>
<b>Urbanization rate (%)</b>	<i>1971</i>	32.07	17.29	72.66	59.80	39.445	79.321	24.89	6.345	47.869
	<i>2010</i>	57.85	30.93	90.52	80.06	66.42	90.96	38.06	15.54	62.21
<b>GDP/cap</b>	<i>1971</i>	3522.84	237.81	19054.82	5375.98	1433.11	14115.0	1809.97	338.90	6215.94
	<i>2010</i>	11486.31	1345.77	44507.67	8702.12	1981.16	13545.20	2753.01	341.309	8000.37
<b>Share emp agricultura (%)</b>	<i>1971</i>	58.28	17.33	79.72	38.12	17.41	60.24	64.89	34.23	85.95
	<i>2010</i>	28.23	4.91	54.66	14.4	6.66	22.41	49.68	7.16	75.14
<b>Share emp industry (%)</b>	<i>1971</i>	15.47	7.36	33.33	23.42	16.84	33.60	11.61	5.18	28.49
	<i>2010</i>	22.6	14.93	28.7	21.54	17.76	26.16	13.4	5.86	30.28
<b>Share emp services (%)</b>	<i>1971</i>	26.23	9.07	49.33	38.45	22.92	51.09	23.49	8.58	37.27
	<i>2010</i>	49.16	25.84	71.28	64.05	57.76	72.45	36.91	16.01	63.12

*Source: Constructed by the author*

Observing the aggregated evolution of employment shares, we can confirm the previous impressions. Asia is the region with biggest changes across sectors, agriculture employment share decrease 30% in the mean and services increases more than 20%, industry we only observe an increase of 7% but might be because Asian countries have almost completed the whole process of structural change, which would hide the rise and fall of industry. Latin America being the most developed region continued with the expected trends, a significant decrease in agriculture and increase in services, with a slight decrease in industry. Sub-Saharan Africa shows few changes in comparison with the other regions, agricultural employment decrease 15% but still being almost 50% on average of the total employment share in 2010. The rest is mainly for services which increase significantly (13%) and industry barely grows a 2%, representing 13% of the total employment in the region. SSA still in 2010 presents characteristics of non-developed countries.

It is also interesting to look at some correlations in order to test some stylized facts that are stated in previous literature related with urbanization. Figure 1 shows the correlation between urbanization rate (%) and log of GDP per capita in 1971 and 2010.

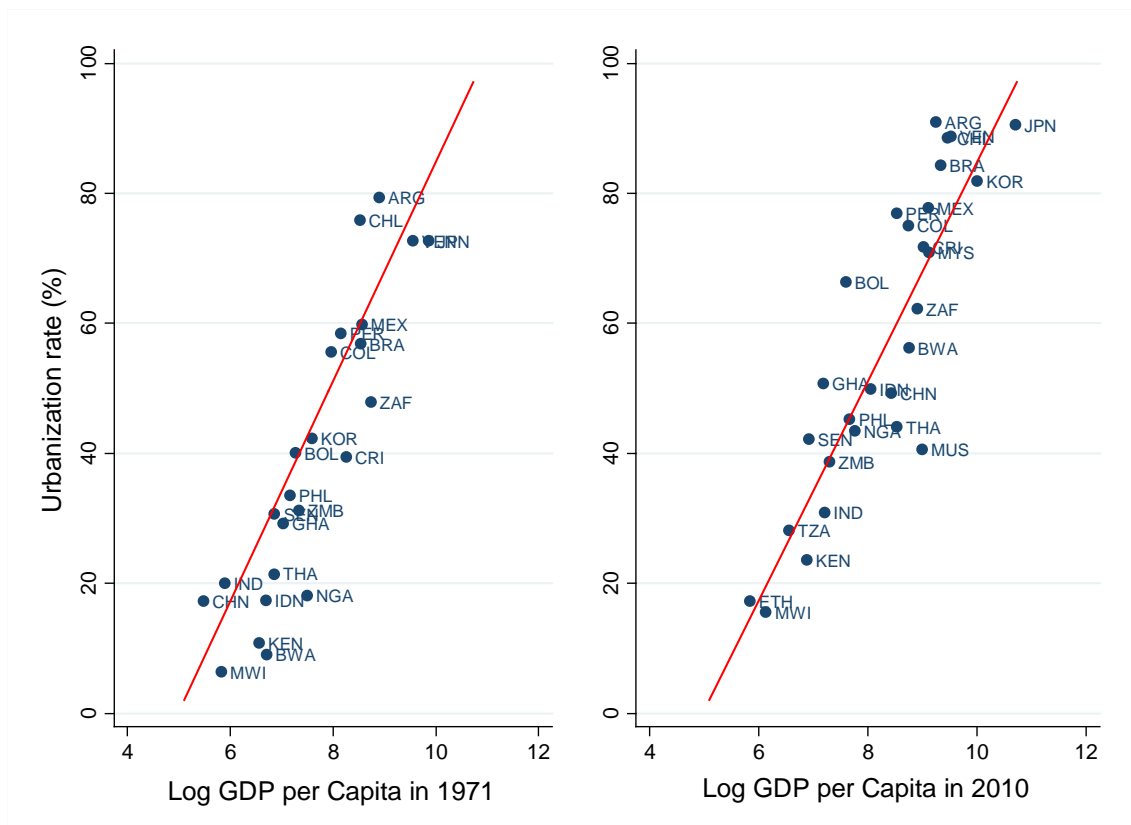


Figure 4.1. Correlation between urbanization rate and log of GDP/cap in 1971 and 2010. The sources are World bank and WUP data, constructed by the author. The solid line is a linear fit for the data.

As it can be observed, there is a clear positive correlation between the variables as the literature suggests in both years, with the Latin American countries concentrated in the upper part of the graph in 1971. In 2010 the graph shows that some Asian countries have

catch up in terms of urbanization and GDP/cap like Korea and Malaysia and the African countries remain at the bottom of the graph. This can already provide some hints about the trends of the evolution of different countries and regions.

In Figure A.1, both Asia and LA show a significant increase of agricultural productivity whereas SSA barely improves. For the industrial productivity, Table A.2 show that only Asia has an important increase (especially in Korea and China) while LA and SSA show a flat trend. Regarding productivity in services, both Asia and SSA improve, whereas LA surprisingly has experienced a decrease in productivity (Table A.3). Overall, Asia is the only region that maintains improvements in all the sectors, as LA and SSA have disparities across sectors. It is also worth highlighting that service productivity trends within LA are more homogeneous than in SSA or Asia.

When it comes to the employment share of each sector, here the trends of the region are more similar. In agriculture, the share decreases in all of them, while in services all regions show an increase. However, in industry trends are very different: Asia increases significantly, LA decreases and in SSA the share is maintained almost constant. Again, the fact that countries in LA have a more homogeneous trend also occur with the share of employment.

This is important because it confirms that the regions had very different dynamics during the period, which, in turn should be reflected in the results. It is also worth to highlight that the rise in the employment share of the sectors is not always correlated with the improvement of labor productivity as theory suggests. This correlation only appears in Asia, whose countries follow the structural change model very closely. However, in SSA and Latin America the dynamics are different. In SSA, there has been a timid improvement in the trend of services productivity, which corresponds to the increase in the employment share of the sector. In industry, however, the labor productivity and its employment share have been stagnant on average. Meanwhile, in LA the decrease of service productivity has been correlated with a significant increase in the employment share of the sector and the stagnation in industrial productivity has coexisted with a decrease in its employment share. One of the factors that might influence those unexpected dynamics is the productivity gap between agriculture and industry or services. Even though the productivity of those sectors does not improve, the existent gap attracts workers from agriculture to the other sectors because with higher productivity is probable that the wage would be also higher. In the empirical part we will perform a more detailed analysis of these dynamics.

Following the ongoing debate between Gollin et al. (2016) and Henderson et al. (2013) about the role of natural resources in the process of urbanization, it is also interesting to investigate the relation between urbanization and rents from natural resources. In figure 2 we can observe that at first sight, there is not a very strong correlation between the urbanization rate in 2010 and the average rents from natural resources during the studied period, although the general trend would be negative. This result is not in line with the results obtained by Gollin et al. (2016), probably due to the fact that they also include countries from the Middle East and North Africa (MENA), which are characterized by

their high level of dependence from natural resources. Hence, excluding them, we obtain that in fact, there is a negative correlation. However, we will analyze this factor more in depth in the next section through quantitative methods.

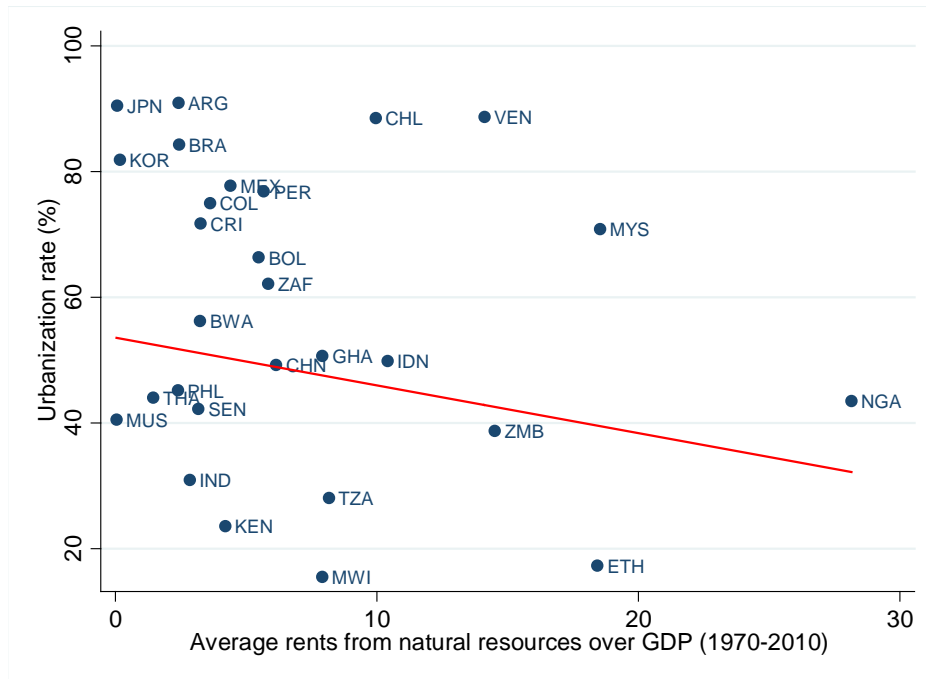


Figure 4.2. Correlation between urbanization rate and average rents from nat. resources in 2010. The sources are World bank and WUP data and it is constructed by the author. The solid line is a linear fit for the data

Hence, it is important to have a first grasp of the data studied in order to properly understand the results of the posterior econometric analysis, its causes and consequences. We have then a first impression of some important correlations, which will be tested in the next section. Furthermore, the differences between regions have been demonstrated with some stylized facts that might have affected their process of urbanization. In the next section, through the empirical analysis we will observe the common patterns that different regions and countries had regarding urbanization. In the second part of the section, the different characteristics of the regions and their particular path of development will test the explanations given by previous research.

## 5. Results and discussion

In this section the results of the proposed specifications are going to be shown and analyzed in order to assess the research questions. Afterwards a discussion about the effects of the results and possible implications will be presented.

### 5.1 Results

In Table 2, we can observe the results for specification (1), with three different models. All models use the full sample with 1078 observations and include country and year fixed effects, although the rest of control variables change from one model to another. Model 1 is the basic unconditional model, which only regresses the interest variables on urbanization rates. Before observing the results, it is important to be aware of the magnitude of the variables. This is important because the magnitudes of the variables are so different that it the interpretation is not straight forward. Hence, it is more important to take into account the sign and the significance of the results. Hence, in (1) we can observe a positive and significant correlation between industrial productivity and urbanization. Furthermore, there is a negative correlation between services productivity and urbanization. Lastly, the correlation between natural resources rents and urbanization also emerges as significant and negative.

Table 5.1. Urbanization and productivity.

	<i>Urbanization rate (%)</i>		
	(1)	(2)	(3)
<i>Agriculture productivity</i>	0.00046 (0.90)	0.00035 (0.63)	-0.00037 (0.64)
<i>Industry productivity</i>	0.00038 (2.55)**	0.00037 (2.00)*	0.00029 (2.17)**
<i>Services productivity</i>	-0.00071 (1.85)*	-0.00068 (1.67)	-0.00044 (1.65)
<i>Agr/Ind productivity gap</i>	0.08084 (1.42)	0.09488 (1.65)	0.00283 (0.05)
<i>Agr/Ser productivity gap</i>	0.43375 (1.01)	0.46311 (1.03)	0.35657 (1.39)
<i>Natural resources rents (%)</i>	-3.216 (2.51)**	-3.175 (2.30)**	-2.199 (1.93)*
<i>Country and year FE</i>	Y	Y	Y
<i>Region-year FE</i>	N	Y	Y
<i>Time varying controls</i>	N	N	Y
$R^2$	0.75	0.76	0.81
$N$	1,078	1,078	1,078

Robust Standard Errors clustered at country level in parenthesis. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$



In 2, region dummies are interacted with years in order to control for region specific trends. With this specification, the correlation between industrial productivity holds, although it loses a bit of significance (at 10%). The significance of the correlation between services productivity and urbanization disappears and the negative impact of rents from natural resources maintains its significance. In Model 3, which is the most complete, time varying control variables are included in the regression. Here the correlation between industrial productivity and urbanization holds its significance although it decreases slightly in magnitude. In the case of natural resources rents, both its significance and impact decrease slightly.

Thus, in this analysis there are two variables that exhibit significant impact throughout the three different models. The first one is industrial productivity, which correlates positively with urbanization rate, implying that higher levels of labor productivity in industry are related to higher urbanization rates. Taking into account that the impact of agricultural productivity is not significant, this result would show evidence in favor of the “labor pull” effect from the cities as a stronger determinant of urbanization. However, the lack of significance of the “labor push” factor might be striking if we follow the theoretical framework proposed since the improvement in agricultural productivity is necessary in order to feed workers that migrate to urban areas, so in the next section some explanations will be examine. Furthermore, a negative significant correlation between natural resources rents and urbanization is found in all the specifications, contradicting previous findings by Gollin et al. (2016).

In Table 3, the results of specification (2) are shown. Since the objective for the second research question was to observe the differences between the regions before and after 1990, 8 different regressions are presented, two for each region in both periods of time and another two for the full sample in both periods. Here we include all the control variables that we use in the previous specification, except the region specific trend which we only use for the regressions with the whole sample. As we interested in examining if the role of industry and services changed due to the “premature deindustrialization” regarding urbanization, we use the employment shares of the sectors as my main variable of interest. Thereby, we replace the productivity of the sectors that “only” incentivizes the migration to the urban areas by this more direct form of measurement.

Starting with the full sample, regressions (1) and (2) show very different results. In specification (1), all variables are significant and the employment shares of both sectors correlate positively with urbanization rate. The coefficient is especially high for industry, although services are more significant. Natural resources rents are also negatively correlated with the dependent variable, in line with the result of the previous specification. However, for the second period, none of those variables are significant, even the sign of services changes. Looking the R squared we find that (1) is much more explicative than (2), which might lead us to think that additional factors appear after 1990 that are not taken into account in the regression.

Table 5.2. Urbanization in different regions and periods.

	<i>Urbanization rate (%)</i>							
	<i>Full sample</i>		<i>Sub-Saharan Africa</i>		<i>Latin America</i>		<i>Asia</i>	
	<i>1970-1989</i>	<i>1990-2010</i>	<i>1970-1989</i>	<i>1990-2010</i>	<i>1970-1989</i>	<i>1990-2010</i>	<i>1970-1989</i>	<i>1990-2010</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Industry employment share (%)</i>	0.435 (2.57)**	0.179 (1.20)	0.160 (0.70)	0.070 (0.35)	0.158 (1.90)*	-0.085 (0.58)	0.891 (6.50)***	0.659 (3.40)**
<i>Services employment share (%)</i>	0.300 (3.51)***	-0.036 (0.21)	0.355 (3.03)**	-0.155 (0.94)	0.152 (1.24)	0.656 (3.07)**	0.308 (1.25)	0.296 (2.07)*
<i>Natural resources rents (%)</i>	-1.391 (2.38)**	-1.197 (1.52)	-1.936 (2.99)**	-0.666 (1.51)	-0.380 (1.02)	-0.823 (1.24)	-1.248 (2.05)*	-3.939 (4.04)***
<i>Country and year FE</i>	Y	Y	Y	Y	Y	Y	Y	Y
<i>Time varying controls</i>	Y	Y	Y	Y	Y	Y	Y	Y
<i>Region-year FE</i>	Y	Y	-	-	-	-	-	-
<i>R<sup>2</sup></i>	0.84	0.72	0.78	0.73	0.95	0.88	0.93	0.92
<i>N</i>	490	560	174	220	171	180	145	160

Robust Standard Errors clustered at country level in parenthesis. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$

Regarding the different regions, we start by analyzing Asia because it is the region which went through what could be called the “natural” structural transformation and is the best example of how according to the theory a country should develop and urbanize. We can observe in the first period (7) that the industrial share of employment has a significant and very strong impact on urbanization. This reflects well the important process of industrialization that the majority of East Asian countries underwent during those years and that has played a very important role for the process of urbanization. Furthermore, the natural resource rents exhibit a negative and significant impact on urbanization, in line with previous results. In the second period (8), there are some changes with respect to the first period. Industrial employment share is still significant, although its impact on the dependent variable is slightly weaker than in the previous period. However, now services employment share emerges as significant and have a positive impact on urbanization. These results reflect the shift that East Asian countries took towards high productive services when they reached the peak in industry, following the “natural path” of structural change. Thus, both sectors played an important role in fostering urbanization over the second period under consideration. Moreover, now the negative coefficient of natural resources has gained both in magnitude and statistical significance. Hence, in Asia we can observe a perfect example of what theory predicts regarding the transformation from an agricultural dominated economy towards industry and later on services.

In LA, the evolution has been different. In the first period (5) we can observe that the only significant variable is the industrial employment share, which has a positive impact on urbanization. However, after 1990, it loses its significance and instead the service employment share turns out to be significant, with a strong influence on urbanization. This confirms the hypothesis that due to the process of “premature deindustrialization” in the last years of the 80’s, industry lost its importance, being substituted by services. Comparing the development of LA with Asia, we can observe several differences such as the much larger impact of industry in Asia or the importance of services in LA. Moreover, in Asia rents from natural resources exert a negative and significant impact on urbanization, whereas in LA the impact of natural resources does not emerge as significant. Furthermore, it might be interesting to highlight that for the case of LA the R squared value decreases substantially between the first and second period, indicating that similar to the Asian case other factors not identified might have appeared to play a role in the process of urbanization.

A third distinct development can be observed for the case of SSA. In the first period (3) we can observe that services employment share and not industry has a significant and positive correlation with urbanization. Also natural resource rents have a strong negative and significant influence on urbanization. However, after 1990 (4), those significances disappeared and none of the variables turns out as significant. Those dynamics do not correspond with what has been expected beforehand, as industry does not play any role in the region and services are already significant in the first period. Looking the R squared, we can observe that the value is significantly lower than in the other regions, especially in the second period. This might indicate that in SSA there are several factors that here are not taken into account and that were important in the process of urbanization.

Therefore, we can assume that in SSA the process of structural change played overall a less important role for the urbanization than in LA and Asia. Another factor that might influence the lack of significance of the sectors is the fact that SSA is characterized by a lot of heterogeneity between countries as we have seen in the data section. Hence, the lack of homogeneity might be translated in lack of correlation between variables in different countries.

## 5.2 Discussion

This study has shown that the overall influence of “labor pull” (i.e. industrial productivity) is stronger and more significant than the “labor push” for the process of urbanization. This result suggests that the “labor pull” drives urbanization through the increase in industrial productivity, which in turn is reflected in rising wages, attracting rural workers to urban areas to work in the industry as theory predicts. However, the lack of significance of the “labor push” is not in line with the strand of literature claiming agricultural productivity to be necessary for the reallocation of rural workers to urban areas. Hence, it is interesting to investigate why this might happen. The lack of significance of the “labor push” might be due to two reasons: the first one is that the improvement of agricultural productivity is a necessary requirement but it is not enough to trigger the process of urbanization. This means that some countries, despite having experienced an increase in agricultural productivity, did not follow the structural change. Therefore, their urbanization rates did not grow at the same rate as in other countries that developed faster. Hence, that would explain why industrial productivity is correlated with high urbanization rates, because it shows that all the countries that improve in industrial productivity got urbanized. A second hypothesis would be that it is no longer necessary to develop a highly productive agricultural sector before turning towards higher productive sectors due to the expansion of global trade in the last decades of the XIX century. In particular, the decrease in transport costs and the great improvement in agricultural productivity in other regions allowed developing countries to import cheap food in enough quantity to feed their population (Glaeser, 2014).

We can test if the “labor push” is a requirement for urbanization by looking whether all countries that increased their urbanization rate also improved their agricultural productivity. As can be observed in Figure A.7 in the Appendix A, there are four SSA countries that increased in urbanization rate while their agricultural productivity was lower than at the beginning of the period. This suggests that the improvement of productivity is no longer needed for the reallocation of labor into urban areas, evidence to reject the first hypothesis. Hence, only the second hypothesis is left, and constitutes a well possible explanation for why the improvement of agricultural productivity is no longer needed. The national “labor push” can be substituted by the international import of food that allows to feed the urban workforce. There is abundant evidence showing the importance of food imports for Sub-Saharan countries (Minot, 2010), especially so for those which did not improve their agricultural productivity (Levin, 2012; Sharma et al., 2005; World Bank, 2018; Dorosh et al., 2009). This dependency might be dangerous for

SSA countries since it leaves them exposed to sudden shocks in food prices which may threaten the food security of the poorest (Wodon and Zaman, 2009)

Moreover, it can also have important implications for rural workers, since the productivity in agriculture does not improve, the wages will remain very low, perpetuating rural poverty. That would incentivize rural workers to migrate to urban areas since wages will be higher there due to the productivity gap. However, it is also interesting to highlight that it is the mere existence of the gap which triggers the migration rather than the size of it according to the results.

In the performed analysis we have also gathered numerous empirical evidence that suggests the impact of natural resource rents on urbanization to be negative. Not only in the first specification the three models show results in this line, in the second specification of the 8 regressions all of them expose a negative sign of the variable and in half of them the result is significant. Hence, this results contradict the argument proposed by Gollin et al. (2016) that natural resources endowment promote urbanization. Furthermore, this contradicts the other argument of Jedwab (2013) that natural resources specially influence positively the urbanization process in Sub-Saharan Africa. The results are in line with Henderson et al. (2013), showing that in SSA the influence of natural resources on urbanization is negative. The negative impact of natural resources might be explained by the fact that the natural resources in some developing countries (especially in SSA) are owned by the state or by an economic elite which extracts rents from its sale. Torvik (2002) states that the high rents incentive rent seeking behavior of investors, changing its investments from productive sectors to natural resources, hampering the structural transformation and hence, urbanization. Van der Ploeg (2011) also explains that in developing countries with weak institutions, the revenues from natural resources induce corruption and avoids the implementation of policies that foster economic growth. Thus, taking into account that natural resource endowments are especially harmful for development in countries with weak institutions (like most of developing countries), it is possible that they also harm urbanization due to the halt of the structural change.

Overall, the results regarding the specificities of each region show that the three regions pursued very different paths in the process of urbanization. First, they confirm the hypothesis that Latin America due to the process of “premature deindustrialization” shifted from industry to services before it was supposed to be, which had a significant effect on its process of urbanization. The case of SSA is more puzzling as there are no signs for a “premature industrialization”. According to them, industry did not play an important role and rural workers migrated to urban areas to work in the service sector, that is how the countries in SSA got urbanized in the first period. After 1990, none of the variables is significant, which means that migration took place due to an “urban pull”, which might be produced by the better living standards in cities and the higher wages out of the market. This has important implications as if countries do not follow a structural transformation like most Asian countries, there will not be increases in productivity and human capital, so people will remain working in low productivity jobs in agriculture or services. This again implies that a lot of people will continue to live in poverty and the

development of the country will be hampered. The urban bias will attract a lot of rural workers to cities to work in low productive services or outside of the market. This is assumed to have also important implications for the development of cities. As Marx et al. (2013) show, countries that experienced urbanization without growth also experienced an increase in slum population. This means agglomerations of people with few resources living in bad infrastructures and poor conditions -i.e. urban poverty. The situation might constitute a poverty trap for the slum dwellers since the low level of productivity and the arrival of more rural workers maintains the wages extremely low, resulting in the perpetuation of urban poverty. On the contrary, in growing countries, the permanence in slums is only temporal because workers increase their wages due to the improvement in productivity and can move to better neighborhoods. Fox (2014) explains that the problem of slums is particularly important in SSA, the developing region with the highest incidence of slums, where more than 60% of the urban population lives in slums.

## 6. Conclusion

The purpose of this thesis is to shed light on the drivers of the urbanization process in Asia, Sub-Saharan Africa and Latin America from 1970 to 2010. As the recent path of structural transformation followed by some developing countries differs from the “classical” one, this difference might raise questions on how this development affects their urbanization process. The contribution of this thesis is to provide an empirical study on the role of structural change on urbanization in developing areas, which is somehow an understudied topic.

In order to do so, two different approaches are taken. The first, more comprehensive, focuses on finding common drivers of urbanization across countries. More specifically, it examines the role of the two main engines of structural change (which are also the main drivers of urbanization), the “labor push” –i.e. agricultural productivity growth- and the “labor pull” –i.e. industrial productivity growth-. Furthermore, the thesis addresses natural resources as another possible driver of urbanization non-related with the development process given its importance in developing countries and the on-going debate around their impact. The second approach focuses on the particularities of the individual regions rather than on the common patterns. Since recent literature in the field has suggested that SSA and LA have deviated from the “natural” path of structural change, -especially after 1990, when they suffered the process of “premature deindustrialization-, it is very possible that this process influenced also their urbanization. Hence, our model tries to analyze the influence of the employment share of industry and services for the urbanization process, in order to observe if there are differences between regions, as predicted by theory. Moreover, we test the hypothesis of recent literature about the positive influence of natural resources on urbanization in some regions. This is important because alternative paths of urbanization might have potential implications for the development process of these countries.

The results show that the “labor pull” driver works as predicted by the theory, and higher industrial productivity is correlated with a higher urbanization rate. However, the “labor push” driver is not significant in any of the models, contradicting the prediction of previous theoretical contributions. Exploring possible explanations for this results, we found that three SSA countries urbanized with a decrease in their agricultural productivity. That suggests that the improvement of agricultural productivity within a country is not a necessary requirement to for urbanization. As previously stated by Glaeser (2014), instead the import of cheap food from abroad can be used to feed a growing urban population. Accordingly, since rural wages remain very low, it is the urban bias that pulls workers to cities. This could be one of the drivers through which poor mega-cities are formed in developing countries. The second important finding is that natural resources are not one of the factors that foster the urban bias. On the contrary, our empirical findings show their influence to be negative and significant across all the models, contradicting the results of Gollin et al. (2016).

Different results emerge when analyzing the three regions separately. They broadly confirm the hypothesis that most Asian countries pursued the “natural” path of structural change and urbanization. Thereby, the industrial employment share is positively correlated with urbanization rates throughout the whole period, while services show a

positive correlation only after 1990. For LA, the results also confirm the theoretical expectations, observing a shift from industry to services in the influence of the employment share after 1990 due to the process of “premature deindustrialization”. However, the most puzzling results arise for SSA, where in the period before 1990 services are positively correlated with the urbanization rate, but after 1990 none of the variables turns out to be significant. Moreover, the explanatory potential of this specification is much lower for SSA than for the other regions, especially in the period after 1990. This suggests that other than the commonly incorporated factors are important for the urbanization process. Nevertheless, the abundance of natural resources was not one of these driving forces since it is negatively correlated and statistically significant for the pre-1990 period. This result is in line with Henderson (2013) and contradicts Gollin et al. (2016) who argue that in SSA the natural resources had a great importance for the urbanization of the countries.

Hence, the results suggest that some countries, especially in SSA but also in LA, have urbanized without experiencing a complete structural transformation. Thereby, the presence of factors that foster the urban bias played an important role in the urbanization process of those countries, although according to the results natural resources were not one of them. This deviation of the “natural” path of urbanization probably had negative implications for their citizens such as the increase of population living in slums and the perpetuation of urban poverty. However, this link has not been studied enough to draw clear conclusions and further research is required in order to properly understand the implications.



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# Appendix A

Table A.1. List of countries and urbanization rate (%).

<i>Country</i>	<i>Code</i>	<b>Urbanization rate (%)</b>	
		<i>1970</i>	<i>2010</i>
Ethiopia	ETH	8,6	17,3
Kenya	KEN	10,3	23,6
Malawi	MWI	6,1	15,5
Mauritius	MUS	42,0	40,6
United Republic of Tanzania	TZA	7,9	28,1
Zambia	ZMB	30,4	38,7
Botswana	BWA	7,8	56,2
South Africa	ZAF	47,8	62,2
Ghana	GHA	29,0	50,7
Nigeria	NGA	17,8	43,5
Senegal	SEN	30,0	42,2
China	CHN	17,4	49,2
Japan	JPN	71,9	90,5
Republic of Korea	KOR	40,7	81,9
India	IND	19,8	30,9
Indonesia	IDN	17,1	49,9
Malaysia	MYS	33,5	70,9
Philippines	PHL	33,0	45,3
Thailand	THA	20,9	44,1
Costa Rica	CRI	38,8	71,7
Mexico	MEX	59,0	77,8
Argentina	ARG	78,9	91,0
Bolivia (Plurinational State of)	BOL	39,8	66,4
Brazil	BRA	55,9	84,3
Chile	CHL	75,2	88,6
Colombia	COL	54,8	75,0
Peru	PER	57,4	76,9
Venezuela (Bolivarian Republic of)	VEN	71,9	88,8

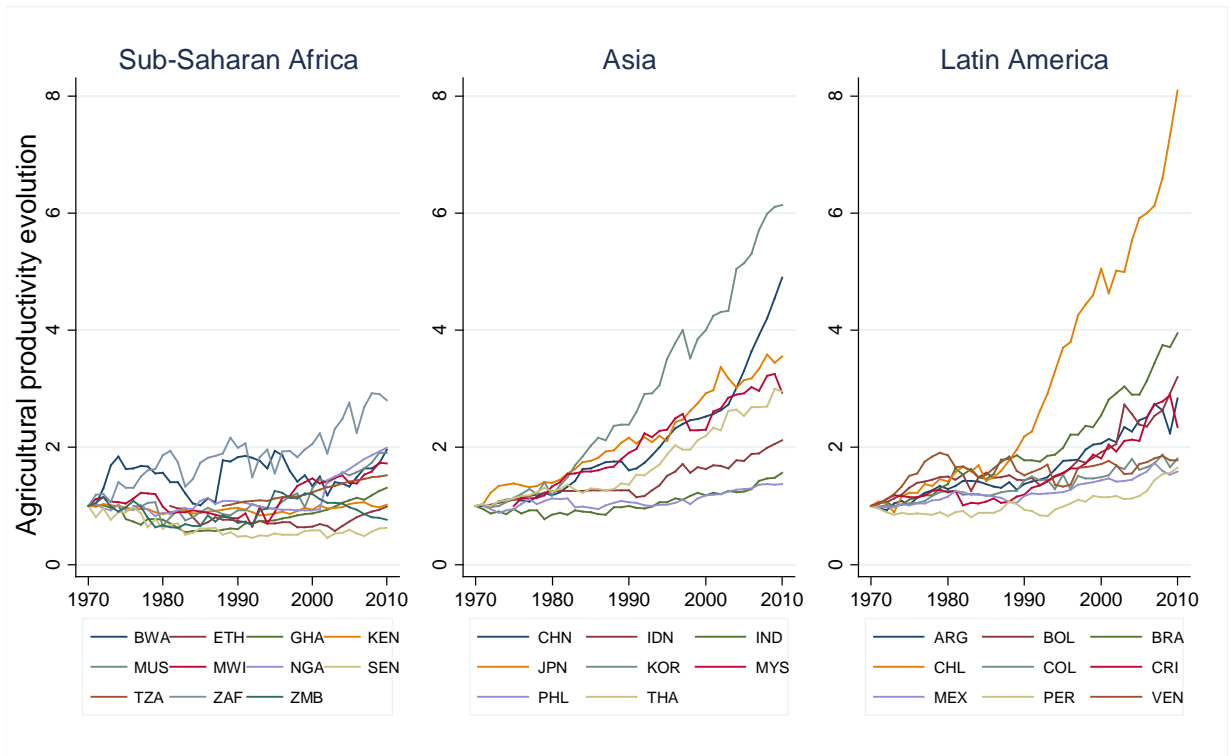


Figure A.1. Evolution of agricultural productivity by region (1970-2010)

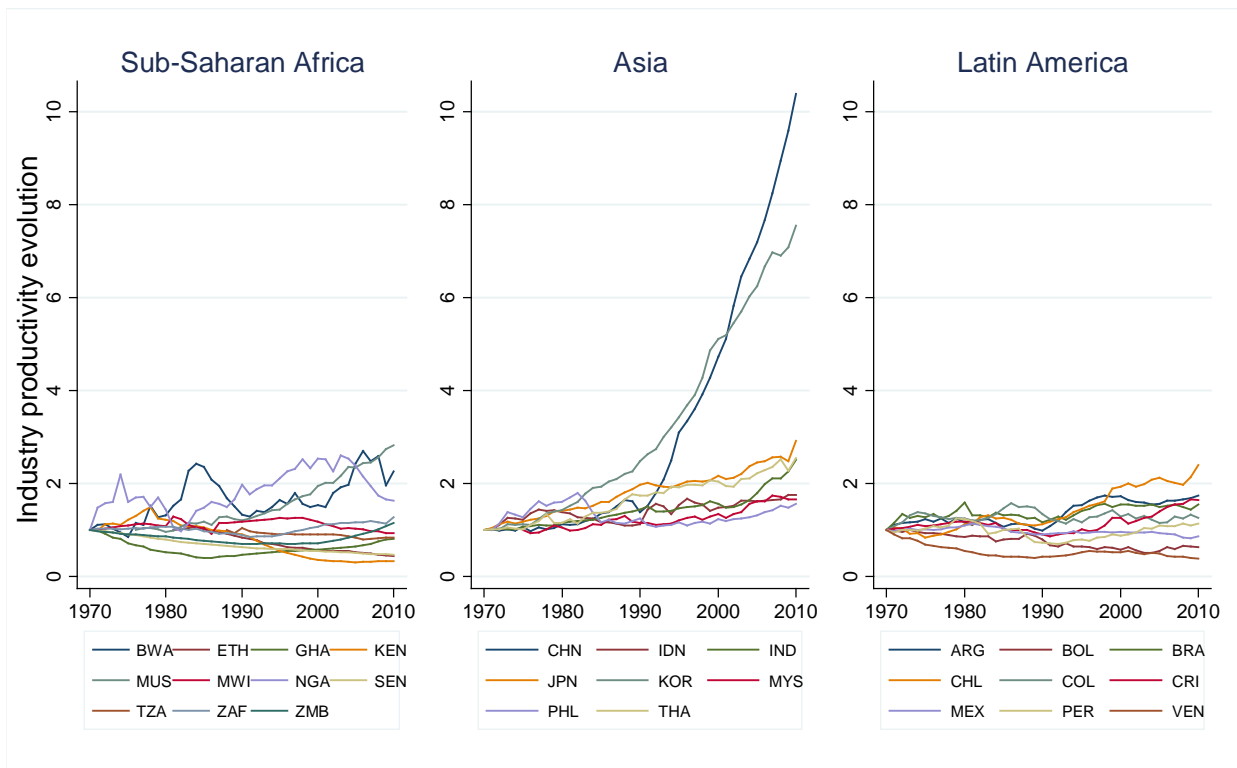


Figure A.2. Evolution of industrial productivity by region (1970-2010)

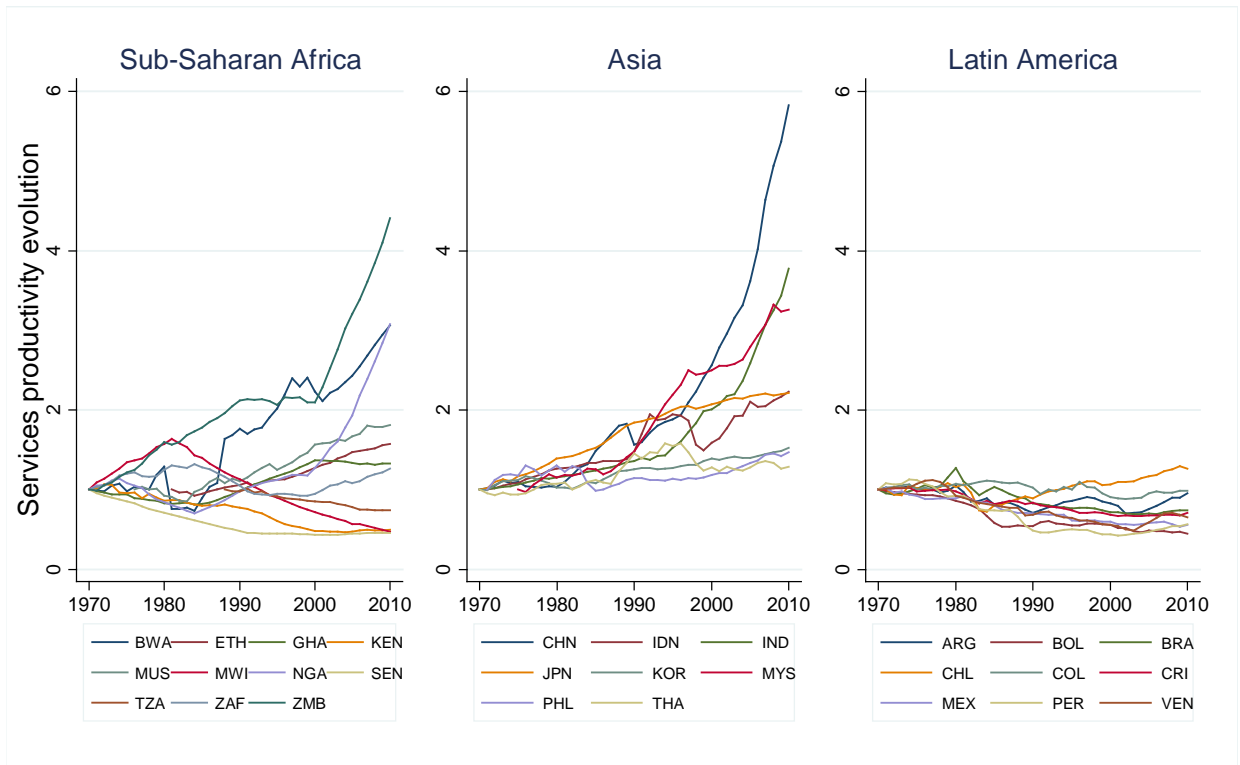


Figure A.3. Evolution of services productivity by region (1970-2010)

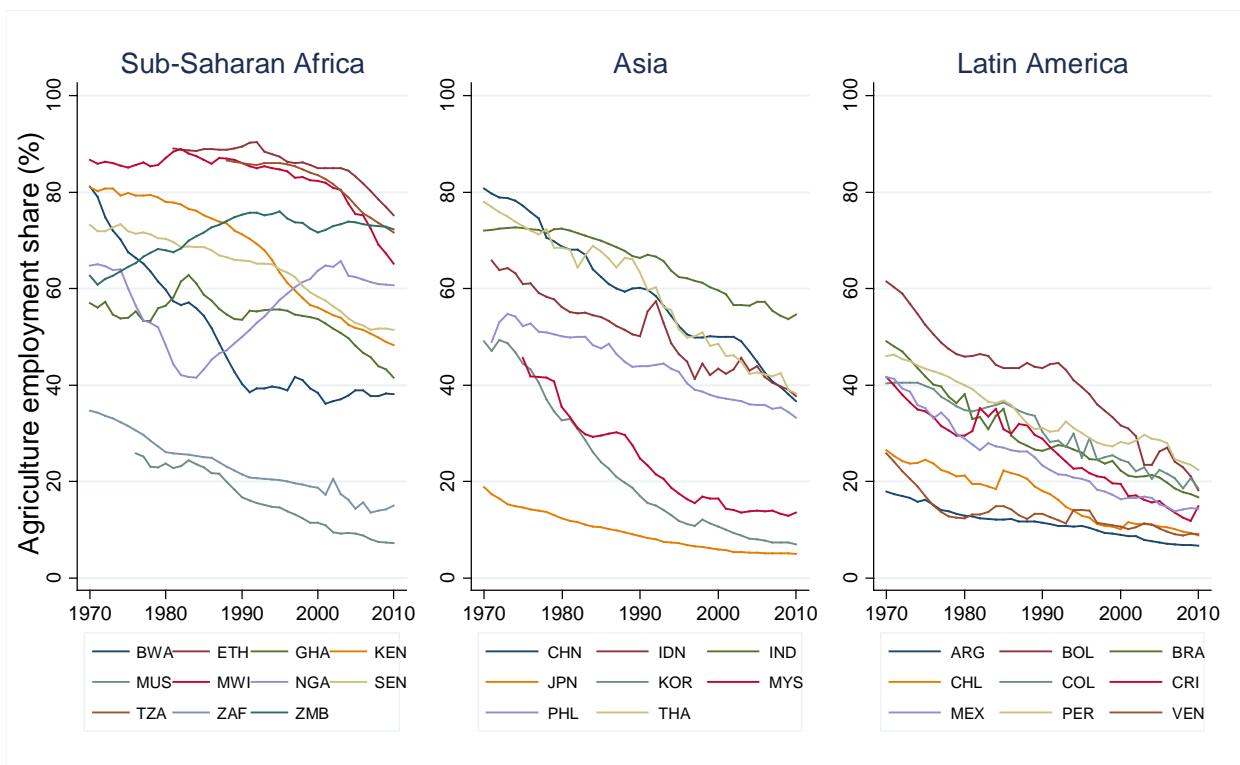


Figure A.4. Evolution of agricultural share of employment (%) by region (1970-2010)

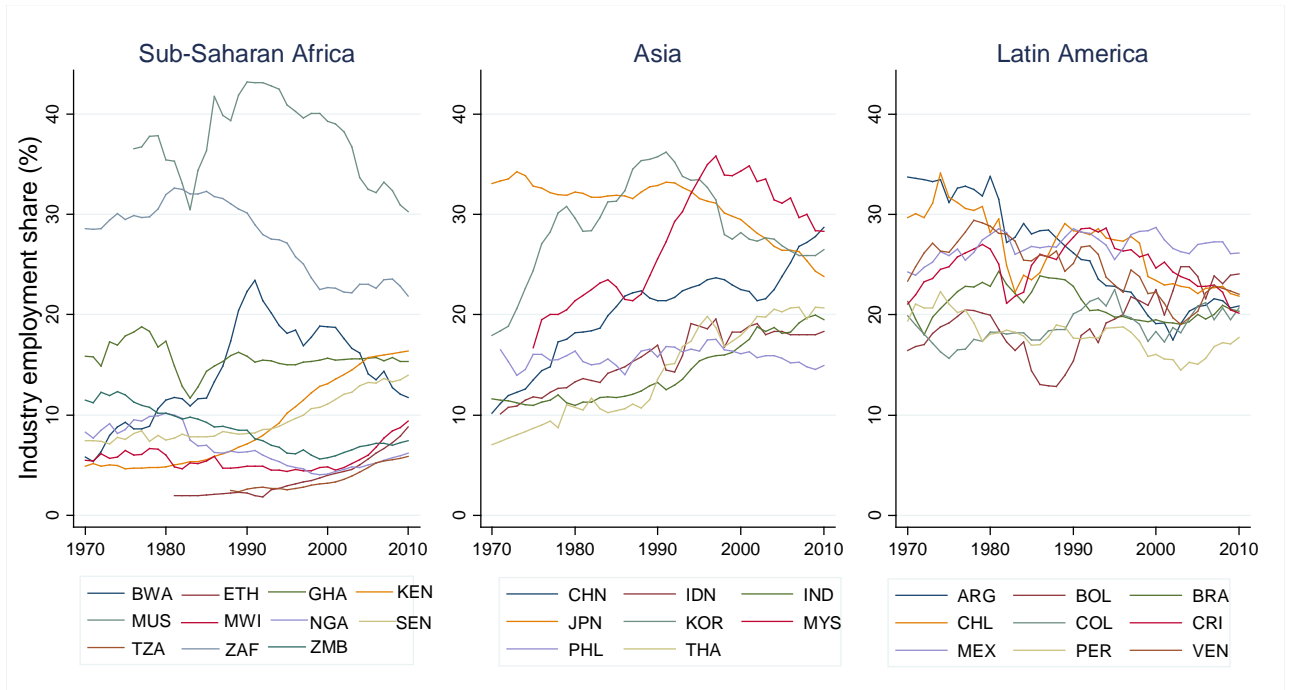


Figure A.5. Evolution of industry share of employment (%) by region (1970-2010)

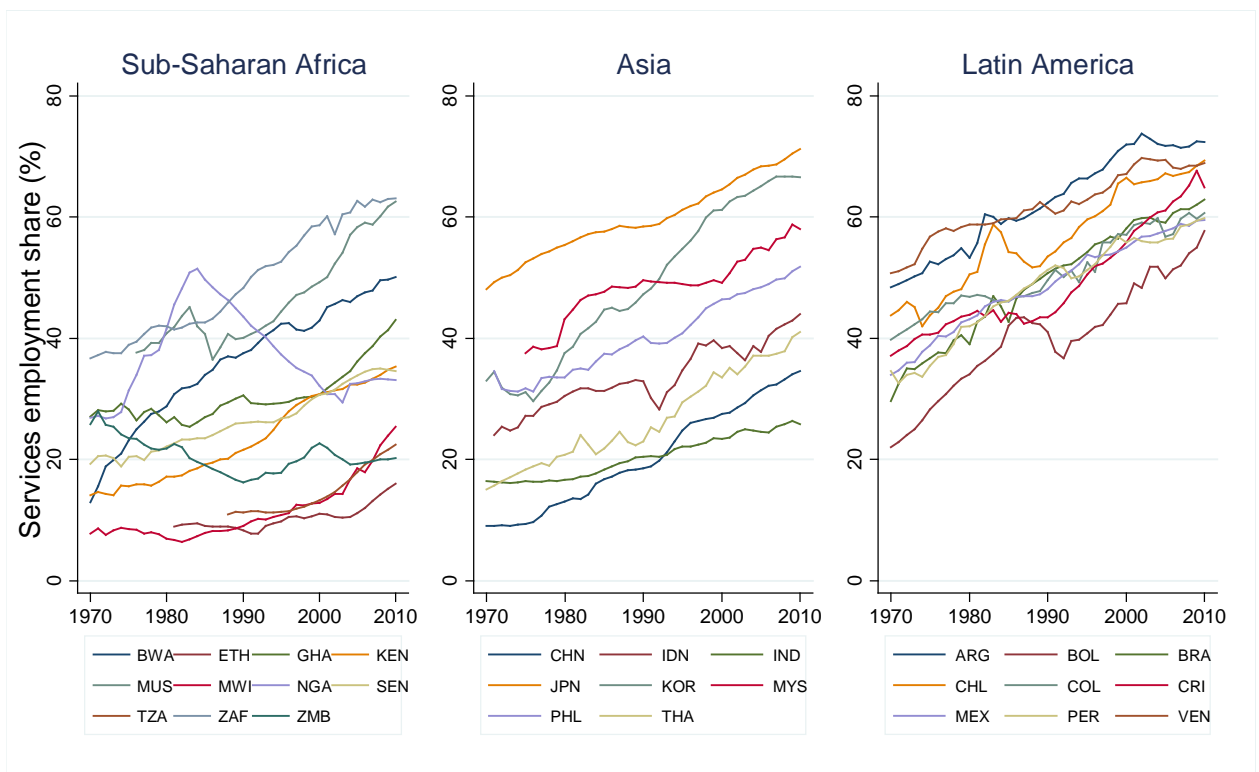


Figure A.6. Evolution of services share of employment by region (1970-2010)



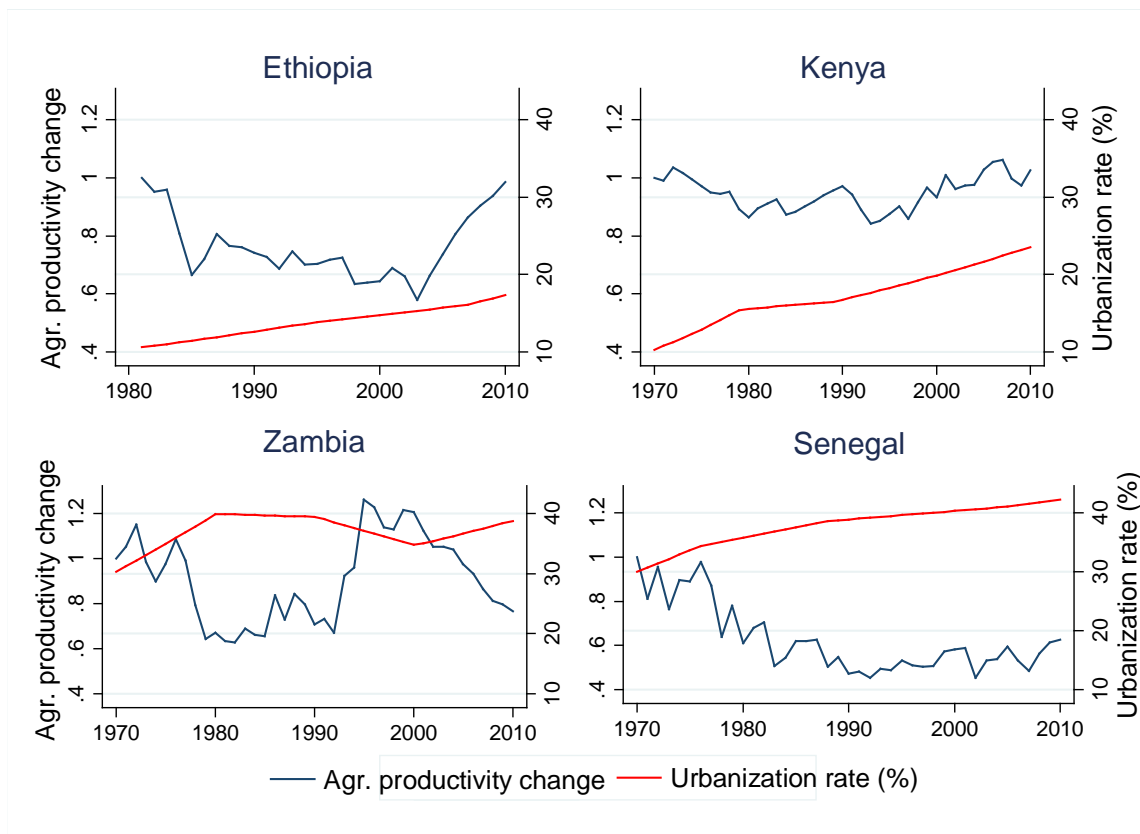


Figure A.7. Countries with no improvement in agricultural productivity (1970-2010)