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Demand and supply factors on the explanation of structural change

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In this article, we explore the determinants of the structural component of productivity. We argue that the structural change, which corresponds to the migration of production and labor to industries that produce goods and services with higher value added per capita, is driven by demand side effects, a very relevant hypothesis for Post-Keynesian and structuralist theories; but, at the same time, we cannot neglect the relevance of human capital accumulation in this process. To test our hypothesis we built a sample that includes data from 40 countries for the 1996-2008 period. We calculate the evolution of within and structural productivity for each country, both in static and dynamic terms, and subsequently tested our hypothesis adopting a panel data model controlled by instrumental variables. The demand side variables are manufactured exports, and investment and supply side variable is the gross enrolment ratio for tertiary The preliminary results showed that our hypothesis is true.

Introduction

The rise in per capita productivity of the economy is a relevant and usual indicator of the economic development process. Authors such as De Vries, Timmer & de Vries (2015), Rodrik (2013), McMillan and Rodrik (2011) and Timmer and Szirmai (2000) adopted the decomposition proposed by Fabricant (1942) to explain the growth of overall aggregate productivity in countries on the basis of the within (changes in productivity in the same industry) and structural (changes in productivity due to migration of labor and production between industries) components. The latter, which is linked to the also called structural change, can be further decomposed into static, which estimates the impact of labor migration for sectors whose average productivity is different, and dynamic, which estimates the impact of labor migration to sectors where growth (rather than levels) productivity is distinct.

Since Adam Smith, authors affiliated to distinct theoretical frameworks agree that labor productivity growth is the key element for the economic development, defined by Bresser-Pereira, Marconi and Oreiro (2015) as "a capital accumulation process with the incorporation of technical progress, resulting in increased productivity, wages and people's standard of living…" Increasing productivity is associated with the "productive sophistication" which is "…the labor transfer to sectors with higher value added per capita" (Bresser-Pereira; Marconi; Oreiro, 2015, p.27). For Rosenstein-Rodan (1943), Prebisch (1949), Lewis (1954), Rostow (1956), Furtado

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(1961), Kaldor (1966), Chenery et al (1986), among others, structural change towards manufacturing is an important stage of this process..

In this sense, Fabricant (1942) argues that, in fact, the relationship between manufacturing and the rest of the economy is reciprocal. The author shows that in many cases, the manufacturing works intensively as a supplier of inputs to other sectors of the economy, but also demand products produced in other sectors, serving as a kind of dynamic link that enhances the growth of the economy as a whole: "the relation of manufacturing to the entire economy has always been a reciprocal one. Changes in one industry stimulate changes in others, through imitation, competition and cooperation "(Fabricant, 1942, p. 162-163). The same argument is adopted by Chenery et al (1986).

In addition to analyzing the central role of manufacturing in the US development process of the late nineteenth century and early twentieth century, Fabricant (1942) was one of the first scholars to make a deep analysis of the evolution of the product and employment in the various sectors of the American economy during this intense growth process. One of his conclusions refers to the increase in manufacturing productivity and its impact in terms of increasing exports of industrial goods from the US to other countries, contributing even further to the economic development of that country. This type of analysis by Fabricant (1942) is aligned with the structuralist ideas and shows that structural changes are relevant to economic development, as argued above.

Despite the discussion about the role of manufacturing, the analysis made by Fabricant (1942), particularly with regard to the measurement of labor input requirements per unit of product included the decomposition labor productivity which was adopted by McMillan and Rodrik (2011) and Peneder (2003) many years later. in order to explain the growth of aggregate productivity of countries based on at least two components: the growth of intra-sectoral productivity, that is, within a sector, and the growth of cross-sector productivity, ie, considering the productivity gains relating to labor migration across sectors.

McMillan and Rodrik (2011) found significant differences between the relative importance of intra-sectoral and intersectoral component for productivity growth among Asian countries, where intersectoral component proved to be very relevant, and African and Latin American countries, where the intersectoral component registered the opposite results. Based on this finding, the authors seek to find variables that explain the growth of cross-sectoral component of productivity in a context of globalization. Therefore, they suggested that structural change can be explained by the depreciation of the exchange rate, the share of agriculture in employment (element that tries to capture the effects of a dual economy), share of raw materials in exports, understood as an indicator of comparative advantages and a proxy for the degree of labor market rigidities.

Peneder (2003) uses the same model to explain the impact of changes in the productive structure in the macroeconomic performance. The author suggests that the intra-sectoral component accounts for a considerably larger share of productivity growth than the intersectoral component. At the same time, the author concludes that the intersectoral component can contribute both positively when the labor migrates to productivity sectors above the national average, and negatively when the labor migrates to sectors with below-average productivity of the country. The net result of these migrations may weaken the potential of structural component of earnings. But as productivity in some sectors grows persistently above the other, hand migration work for these sectors can be beneficial to aggregate growth.

A more recent analysis by De Vries et al (2015) adopted data from a large number of African countries to analyze the effects of structural changes in production allocation on that continent. The authors state that, during the period from 1960 to 1975, Africa had significant economic growth and also expanded its industrial capacity. This would be a result of changes in the economic structure of the countries that promoted industrialization. To defend this argument, the authors state that, in the 1990s, when African countries showed an increase in the share of services in the economy, growth rates were not as high as in the period that the manufacturing sector expanded. They claim that this pattern is also observed in Latin America, but not in Asia, ie the industry in Asian countries remains relevant to explain much of the growth of the continent.

The study by De Vries et al (2015) has contributed to improve the database available for African countries and thus provide more consistent results to demonstrate the thesis that the period of greatest growth in the continent coincided with the period that industrial activities have advanced more quickly. Thus, it can be concluded that the contribution of De Vries et al (2015) updates and expands the results mentioned by McMillan and Rodrik (2011) for African countries, which gives more prominence and relevance to the structural component of productivity.

Using the same database, Magacho (2016) conducts a study of the production structure of various countries and states that there is evidence that the long-term economic growth is closely related to structural changes. The author highlights the relevance of migration of workers from low productivity to high productivity sectors and points out, however, that the increase in productivity resulting from this process is only relevant for countries on the early stages of development. For average productivity of countries like China and Brazil, productivity growth would depend on the development of specific sectors of the economy.

In his analysis, Magacho (2016) states that the manufacture, unlike sectors such as agriculture, contributes to the growth of aggregated productivity in both its intra-sectoral component and in its intersectoral component, which gives an important feature for this sector in particular. In addition, the author's analysis suggests that countries with the intent of promoting economic growth should encourage export growth in sectors that have income elasticity of high exports and discourage imports of sectors that have income elasticity of high imports, avoiding thus future restrictions on the balance of payments that could jeopardize the continuity of the growth process.

Firpo and Pieri (2014) make a methodology-based analysis similar to that adopted by the authors discussed so far in this section, but with a focus on Brazil, and present evidence that the country has undergone intense structural change in the economy since the beginning of the decade 1950. in this period, the country has dramatically increased the share of industry in GDP reaching 45% at the end of the 1970s However, structural change would have lost relevance in the years that followed. The authors say that after this period, productivity growth in the Brazilian economy was largely due to the intra-sectoral component. Their analysis compares the results based on database used by McMillan and Rodrik (2011) and De Vries et al (2015) with the results estimated with database available at PNAD - National Household Sample Survey. The authors conclude that the two databases point results in similar way and try to explain the dynamics of the Brazilian recent productivity through microeconomic aspects such as reducing informality, increasing urbanization and increased years of schooling of workers. In addition, the authors explain that the economic liberalization started in the 1990s led to the selection of more efficient firms and better technologies incorporated into their processes, which partly explains the relative success, via intra-sectoral component of the Brazilian economy in the years 2000. This movement, which had begun in the 1980s with the democratization, reached its peak during the 1990s and, according to the authors, the 1990s trade liberalization, despite having no impact on the relevant structural change, may have been the main reason for the intra-sectoral productivity increases.

Hausmann, Hwang and Rodrik (2007) argue, based on a structuralist framework, that countries that specialize in the production of products that are exported by developed countries tend to grow faster. The authors go further, saying that rich countries are those that produce "products of rich countries" while poor countries tend to stay poor while producing "products of poor countries." Thus, the authors make an analysis of the export of a number of developed and developing countries and conclude that those who export products associated with better productivity levels have faster economic growth.

The distinct approaches adopted by those authors show that the discussion about the explanations for productivity growth is still linked to the debate about supply and institutional factors or structural and demand factors to explain the growth process. This paper will test the influence of both groups of variables to explain inter and intra sectorial productivity changes. In order to proceed with this analysis, the methodologies for productivity decomposition will be initially discussed.

So in addition to the present theoretical introduction, this paper includes four more sections. In Section 1 we discuss the different methodologies to estimate the components of productivity, in Section 2 we estimate the productivity decomposition for a sample of 40 countries, in Section 3 we perform the econometric tests based on our hypothesis, and finally we present the main conclusions.

Section 1
Decomposition of the productivity

The verb to decompose can be understood as isolated in trainers or components. In this sense, the idea of decomposing productivity growth, as used here, refers to the search to identify the components of productivity that have their own dynamics and thus allow a better analytical understanding of productivity growth, which in general is measured by the ratio between the value added and number of persons employed to generate that value (labor productivity). Data about capital productivity is scarce and difficult to measure, and a improvement in capital productivity will also result in a labor productivity increase.

Looking at the specific case of the sectorial productivity , it is possible to observe at least two situations that would lead to increases in labor productivity. At first, productivity grows by the initiative of some of the companies that comprise it. That is, assuming that a company in a sector to become more productive, either because they implemented improvements in its production process, either because they could, through various negotiations to add more value to your product, and that other companies maintain their average productivity, then the sector's productivity will grow in proportion to the relative importance of this company for the creation of value added in the sector as a whole.

In the second situation, assuming that the average productivity of each of these companies does not change, if there is a hand migration work for a company more productive to less productive enterprise it is expected a reduction of the average sector productivity, and the opposite is true.

Given the purpose of decomposition, it is possible to assume that each of these situations can be analyzed as a specific effect on the average growth composition of the productivity of an industry. The same must be true for analysis at the national level, where each sector has a different average productivity and the country's productivity as a whole can grow so much because the sectors increment their productivity individually and because the labor migrates from one sector to another. The first situation is known as intra-sectoral productivity growth, where productivity growth is due to the increase in productivity that occurs within the sectors, while the latter is known as intersectoral or structural productivity growth, in which growth productivity is a function of labor migration between sectors.

But the structural component of productivity growth can be further decomposed into two other subcomponents. The first, called static intersectoral, reflects the situation in which labor migrates to sectors whose productivity levels are higher (or lower) from those where it was originally employed, ie the labor migrates between sectors whose productivity medium is different. And the second case, called dynamic component inter-sector, where labor migrate across sectors whose growth variations (instead of levels) are different (De Vries, 2015).

There are several possibilities for mathematical derivations that have been developed to decompose productivity into its components. De Vries (2015) analysis the different methods used in the decomposition of productivity. As a rule, in all four formulas discussed in **Equations (1)**, **(2)**, **(3)** and **(4)**, the first term, which multiplies the productivity change by the respective industry share in total employment, is called intra-sectoral effect. The second component, which multiplies the change in sectoral share in employment by the same industry productivity level, is called (static) inter-sectoral or structural effect. The third component, as it will be seen below, may not appear in the formulas. It is calculated by multiplying the sector's productivity variation by the variation in the share of same industry in total employment, and it is called inter-sectoral dynamic effect.

The formula shown in **Equation (1)** distinguishes the three terms (they are calculated separately) described above and it is adopted by Peneder (2003) and Timmer and Szimai (2000 of the third component has an interesting economic interpretation, since it differentiates sectors with higher productivity levels of those with growth variations in greater productivity, indicating that the relocation of the job can be both static and dynamic (Timmer and Szimai 2000).

$$\Delta P = \sum_i (P_i^T - P_i^o) S_i^o + \sum_i (S_i^T - S_i^0) P_i^o + \sum_i (P_i^T - P_i^o)(S_i^T - S_i^0) \quad (1)$$

Where, ΔP is the change in the average productivity of the economy, ie, $P^T - P^0$,, P_i^T is the sector i productivity at the time T and S_i^T is the share of the sector i in the total employment at time T. These same variables will be used in the following formulas.

It is interesting to observe that the third component is only positive if the first two terms of equation (1) are jointly positive or negative, ie, if the labor participation and productivity of a sector are growing or alternatively if both fall. Thereafter, if a labor sectorial share is increasing, the static structural component will grow, but the dynamic structural component only grows if the productivity of that sector also grows. Keeping constant the capital stock, the marginal increase in product due to one additional worker tends to be smaller than the average productivity, so the static and dynamic structural components frequently have opposite signs

Instead of adopting the sectoral employment share and productivity in T_0, the **Equation (2)** includes the average between T_0 and T_1 to calculate the decomposition of productivity. This approach, used by Syrquin (1984) and Magacho (2016) also distributes the dynamic structural component (included in Equation 1) between the other two terms in the equation, implicitly weighting both by their relative relevance.

$$\Delta P = \sum_i (P_i^T - P_i^o) \overline{S}_i + \sum_i (S_i^T - S_i^0) \overline{P}_i \quad (2)$$

The third formulation, expressed in **Equation (3)** considers employment at period 0 and productivity at period T. Thus this formula includes the value of the dynamic structural component in the second term of the equation, ie in the structural static component. This formula has the characteristic of adding the two structural components. But at the same time, as is often observed a negative relationship between the static effect and dynamic effect, this form of calculation try to give greater relative importance to the intra-sectoral component.

$$\Delta P = \sum_i (P_i^T - P_i^o) S_i^o + \sum_i (S_i^T - S_i^0) P_i^T \quad (3)$$

The approach of McMillan and Rodrik (2011) and Firpo and Perri (2014) adopts **Equation (3)**, which itself tends to reduce the relative importance of the structural component in the analysis, since it incorporates the estimation of the dynamic structural productivity in the intersectoral component. De Vries (2015) draws attention even for a supposed misinterpretation: "McMillan and Rodrik (2011) argue that workers move to low-productivity growth sectors, but they use the decomposition that measures productivity levels ". (De Vries, 2013, p.16).

Therefore, it is important to note that once the methodology is chosen, the interpretation of the coefficients must also be adjusted to reflect properly what is being measured in fact. Finally, **Equation (4)** uses the sectorial employment share in time T and productivity at time 0. This equation includes the value of the dynamic structural component in the first term of the equation, ie, the intra-sectoral component. This formula is used in De Vries's article (2015) to show how the components calculated in this way differ from those calculated based on other approaches.

$$\Delta P = \sum_i (P_i^T - P_i^o) S_i^T + \sum_i (S_i^T - S_i^0) P_i^0 \qquad (4)$$

It is important to highlight that, the dynamic structural component could also be called dynamic intra-sectoral component, because it is possible to think that an increase in intra-sectoral productivity would turn the sector more competitive and growing at higher rates and, consequently, this sector would attract more workers from other sectors. For that reason, as the dynamic intersectoral component of productivity could actually be considered as a dynamic intra-sectoral component. This argument can be illustrated by the contents of **Table 1**.

Table 1 – Comparison of the effects of productivity

Effect	Feature	Formula
Intrasectoral	Static	$\sum_i (P_i^T - P_i^o) S_i^o$
Intersectoral	Static	$\sum_i (S_i^T - S_i^0) P_i^0$
???	Dynamic	$\sum_i (P_i^T - P_i^o)(S_i^T - S_i^0)$

Elaborated by the authors

In **Table 1**, the first formula presented refers undoubtedly to an intrasectoral effect, since the participation in employment of each sector are kept constant, but are incorporated in the productivity changes. In turn, the second formula refers to an intersectoral component, since the employment sectoral share changes, but the productivity level is kept constant. However, the third formula is certainly a representation of a dynamic effect, but one cannot state unequivocally that it is related to intrasectoral or intersectoral variations, because this formula considers both variations, in productivity and the employment sectoral share. This is a question for a future research agenda of improvement in the estimation, but the question is relevant since there is not *a priori* theoretical motivation that defines the interaction term as intersectoral necessarily.

The diversity of approaches that can be applied to decompose productivity in its components turns difficult to pinpoint, *a priori*, the possible differences among the results of each approach. But it is possible to say that the intra-sectoral component of formulas 1 and 3 are always the same, since they are calculated similarly. The same applies to the static structural components of the formulas 1 and 4. The intra-sectoral component of the formula 4 is the intra-sectoral component of Formula 1 plus the dynamic inter-sectoral component of the formula 1, and the same logic applies to static intersectoral component of the formula 3. Finally, in the formula 2, half the static intersectoral component of formula 1 will be addressed to the intra-sectoral effect and the other half to the intersectoral effect. **Table 2** summarizes the distribution.

Table 2 - Summary of the formation of the coefficients of the effects of productivity

Formulas	Intrasectoral	Intersectoral	
		Static	Dynamic
1	a	b	c
2	a+(c/2)	b+(c/2)	
3	a	b+c	
4	a+c	b	

Note: elaborated by authors.

It becomes clear that the distinction between the results of each approach is basically due to the dynamic inter-sectoral effect, since it will be added to different terms on its respective equation.

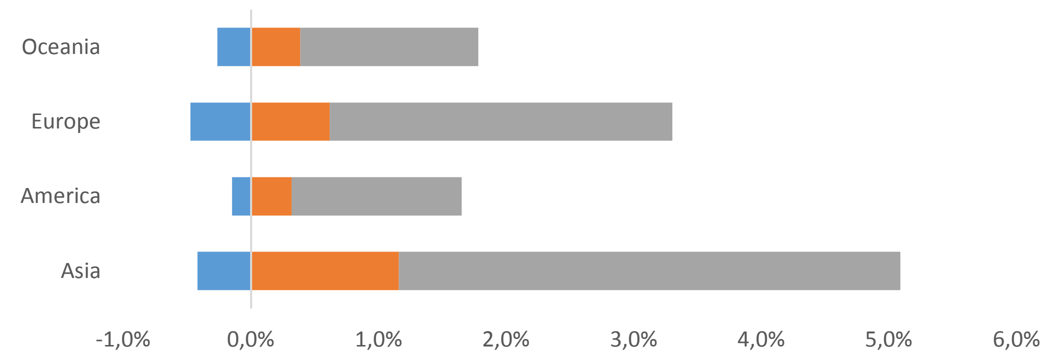
After this methodological discussion, estimations of the productivity components will be presented for a sample of countries, allowing comparing results for groups of countries. Then we will introduce the model that will try to explain the influence of demand and supply variables on the determination of structural and intersectorial components of productivity.

Section 2
Data and estimations for components of productivity growth

In order to test our hypothesis, there is, demand side effects are relevant to determine structural change (measured by the intersectoral component of productivity growth), and supply side effects can also contribute for that change, first we estimate the intra and intersectoral (both static and dynamic) components of productivity growth for a sample of 40 countries from 1996 to 2008, based on data from the World Input-Output Database (WIOD). The advantage of this database is the standardization and disaggregation of National Accounts for 35 sectors, which enables to build better estimators of those components of productivity. We proceed to these estimations and then we perform econometric tests to check the hypothesis.

The available sample includes 28 European coutries, 7 Asians, 4 Americans and 1 from Oceania. The equation 3 of the previous session was adopted to estimate the decomposition and the components of productivity. . This equation allow to disaggregate both static components and the dynamic one. Since the dynamic component does not represents necessarily a intra sectorial or structural change in the productivity, as it was discussed in the previous section, we will consider, in our econometric tests, the results for the inter sectoral component as the proxy of structural change. We will also perform the same econometric tests for the intra sectoral component of productivity, in order to realize if demand or supply side effects also prevails on the explanation of intra sectorial changes. The results are presented in Graph 1, and they correspond to the average of estimations for components of productivity change for a set of countries included in each region.

Graph 1 – Growth of productivity by its components by region, average for the period 1996-2008



	Asia	America	Europe	Oceania
Dynamic	-0,4%	-0,1%	-0,5%	-0,3%
Intersectoral	1,2%	0,3%	0,6%	0,4%
Intrasectoral	3,9%	1,3%	2,7%	1,4%

Source: WIOD elaborated by the authors

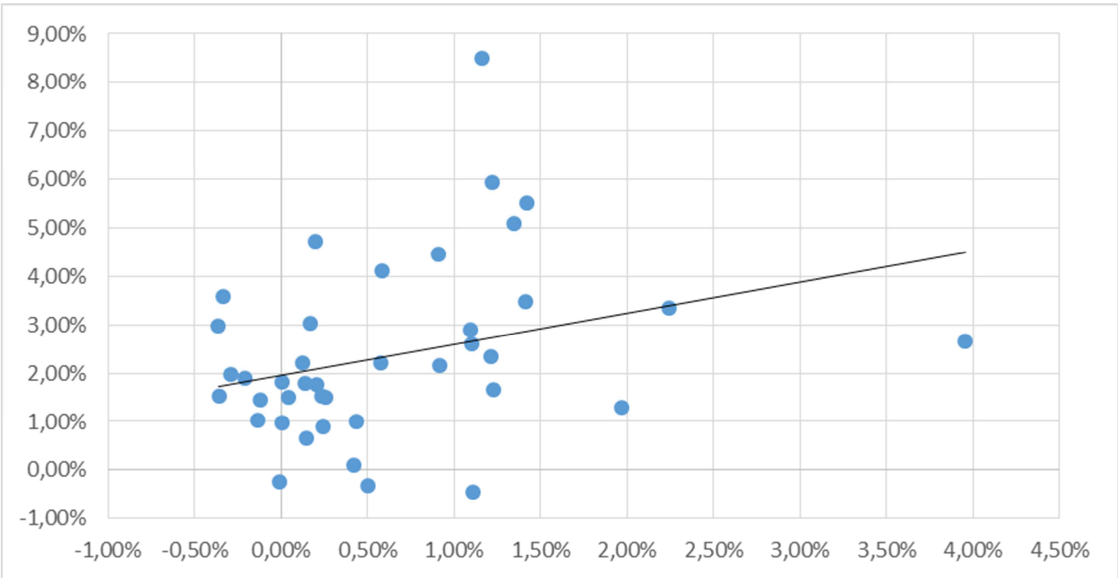
The Graph 1 shows that most of the productivity's growth happens through its intra sectoral component. Related to the inter sectoral component, the Asian continent presents the largest growth, followed by the European continent. Inside Europe, this growth is not homogeneous. From the 28 European countries, only 9 present intersectoral productivity growth above 1% and all of them are from Eastern Europe, leaded by Romania (4,08%), Lithuania (1,62%) and Poland (1,54%). This shows a stylized fact that country that are growing faster tend to register more accentuated growth of its productivity intersectoral component. Disaggregated data on Western and Eastern Europe, which shows significantly different results, are included in Table 1.

Table 1 – Growth of productivity by its components by sub region in Europe, average for the period 1996-2008

	Dynamic	Intersectoral	Intrasectoral	Total
Western Europe	-0,1%	0,0%	1,2%	1,1%
Eastern Europe	-0,8%	1,0%	3,1%	3,3%

We also plot the relation between average intra and inter sectoral productivity in each country for 1996-2008 period. It is possible to realize that both components of productivity tend to be positively related.

Graph 2 – Relation between intra and inter sectoral for each country (average in the 1996-2008 period)



Since we estimate the components of productivity growth for each country, next step is to discuss if demand and supply side factors exert influence on changes of these components.

Section 3

Econometric tests and results

As the Keynesian theory supports, growth is demand driven and the most relevant component of this process is the investment, which can be stimulated, when the private aggregate demand is constrained, by the so-called autonomous expenditure, consisted by exports (to catch the external demand) and public spending. In particular, the processes of exports diversification and exports industrial sophistication contribute decisively to structural change (Hausmann, Hwang & Rodrik, 2007). Exporting manufactured goods stimulate domestic demand, the process of learning-by-doing, productivity increases (as per Verdoorn's law) and the development of new comparative advantages.

On the other hand, growth models based on supply side factors tend to emphasize the role of human capital in the productivity growth (Barro, 2001, Romer, 1989, Becker, 1975, Solow, 1956 are some of pioneers on this subject).

Considering both approaches, we will perform an econometric test to estimate the impact of both set of explanations on growth process and, more specifically, on the components of productivity variations discussed on this paper. The estimated model is:

$p_{it} = \beta_0 + \beta_1 Z_{it} + \varepsilon_{I,}$ where

p_{it} is the component of productivity growth (inter or inter sectoral)

Z_{it} is a vector of other explanatory variables, which includes investment rate (at constant prices), share of manufacturing in total exports from demand side and gross tertiary enrollment as a proxy of human capital in a society (from supply side). It is also included a control variable, the share of agriculture in value added, like in McMillan and Rodrik (2011), in order to control for the share of less sophisticated sectors in the productive structure and trying to catch some characteristics of dual economies. The subscript I relates to the country and t to the year information.

It is adopted a panel data model in which we control for endogeneity by the inclusion of instrumental variables. Results are consistent so they don't indicate that a dynamic model would be necessary to estimate the results of the model.

First it was estimated fixed and random effects models. Hausman test showed that there is a systematic difference in the estimates, so we cannot support the assumption that the estimators of random effects model are efficient. So it was defined a series of instrumental variables, based on lagged explanatory variables, in order to control for the possible endogeneity of the variables included in the model, which is estimated by the fixed effects approach.

Tests of underidentification and overidentification of instruments were performed and the results allow to not refusing that the instruments are valid and consistent.

Results of estimations are presented below, where the columns are the different econometric methodologies adopted and the lines are the variables.

Bfe_inter is the fixed-effect regression for the inter sectorial productivity;

Bre_inter is the random-effect regression for the inter sectorial productivity;

Bvi_inter is the fixed-effect regression with instrumental variables for the inter sectorial productivity;

Bfe_intra is the fixed-effect regression for the intra sectorial productivity;

Bre_intra is the random-effect regression for the intra sectorial productivity;

Bvi_intra is the first fixed-effect regression with instrumental variables for the intra sectorial productivity, in which we cannot refuse the underidentification and overidentification of instruments;

Bvi_intra is the second fixed-effect regression with instrumental variables for the intra sectorial productivity, in which we changed the lag of one variable and the results allow to not refusing that the instruments are valid and consistent.

Inter_g and Intra_g are, respectively, the growth rate of inter and intra sectoral components of productivity;

Lninvc is the log of investment rate (in constant currency);

Lnman_exp is the log of manufacturing share in total exports;

Lnagric is the log of agriculture share in value added;

Lninter is the log of gross tertiary enrollment (in percentual)

Inter_prod and intra_prod are the instrumented variables, corresponding respectively to the absolute change in inter and intra sectorial prioductivity.

Variable	bfe_inter	bre_inter	bvi_inter
inter_g			
L1.	-.18849255	-.00123918	
	-3.73	-0.03	
lninvc			
D1.	.02360114	.03699812	.03904823
	1.72	2.66	1.98
lnman_exp			
LD.	.04530387	.04365897	.05747971
	1.95	1.81	1.90
lnagric			
LD.	.0079671	.00374232	.01421138
	0.82	0.37	1.14
lntert			
LD.	.0371073	.07232315	.04618147
	1.87	3.95	1.85
inter_prod			
L1.			-.00024685
			-2.58
_cons	.00653963	.00325764	
	4.27	2.18	
			legend: b/t

Variable	bfe_intra	bre_intra	bvi_intra	bvi_intra_1
intra_g				
L1.	.14284179	.37513976		
	2.43	7.64		
lninvc				
D1.	.1876592	.15697714	.20907222	.21345529
	8.92	7.68	9.37	9.29
lnman_exp				
LD.	.07018208	.08406342	.01395358	
	2.04	2.45	0.33	
D1.				-.06792009
				-1.46
lnagric				
LD.	-.0165972	-.02046105	-.02904448	-.02834501
	-1.15	-1.43	-1.88	-1.80
lntert				
LD.	.08506266	.09734206	.11475002	.11863879
	2.91	3.65	3.73	3.78
intra_prod				
L1.			-.00002368	-.00007922
			-0.36	-1.27
_cons	.01428708	.00722085		
	5.35	3.06		
				legend: b/t

The results showed that both demand and supply side effects seem to be relevant to explain structural change (considering the significant level at 10%). Same conclusion applies to intra sectorial productivity, but in this case manufacturing exports are not relevant and investment rate seems to be more important than tertiary enrollment.

As expected, investment rate is, in both cases, significant to explain productivity changes. Tertiary enrollment is also important, so we cannot neglect the relevance of human capital for economic development. It is important to highlight the importance of manufacturing exports for structural change.

Concluding Remarks

Throughout this paper we discuss the relevance of structural change for economic growth and how to estimate this component of productivity (called intersectoral), as well as the other component, called intrasectoral. We showed, performing econometric tests, that demand side variables, more specifically, investment rate and manufacturing share in total exports, are relevant for determine the structural change. Changes in intrasectoral productivity are also strongly influenced by investment rate. Also we cannot neglect the influence of human capital in productivity increases. So demand driven forces are relevant for structural change, including a relevant component of autonomous expenditure, the manufacturing exports. Public policies should consider this finding, at the same time that the permanent focus on human capital accumulation is essential for growth.

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