Labor share and development

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Abstract *We highlight a U-shaped relationship between development and the labor share of income. We exploit the within dimension of a panel dataset for the wage bill and value added in the manufacturing sector for developing countries. Data is available at the aggregate manufacturing level and also at the desaggregate level for 28 manufacturing sub sectors. We show that the U-shaped pattern of the labor share we observe at the aggregate level is also observed at the sub sector level suggesting it' does not correspond to reallocation forces across sector that occur during the development process. Our theory emphasizes the role of firms' monopsony power when labor market has frictions in a dual labor market in which modern and high productivity firms coexist with low productivity and traditional firms. At first stages of development, productivity gains are not compensated by wage increases, as most of workers' outside opportunities depend on the low productivity traditional sector. At later stages, the labor share increases as a result of wage competition in the modern sector.*

keywords: *Development ; dual labor market ; Labor share ; Matching frictions*

J.E.L classification: *E25 ; J42 ; O17*

1 Introduction

There is a vast literature both theoretical and empirical linking income inequality to economic development starting with Kuznets [29] and which highlight an inverted U-shaped pattern of inequalities along the development path. In this paper, we adopt an original perspective concerning this debate by focusing on the labor share of income, that is the ratio of wage bill to value-added. The example of China is illustrative. Since the beginning of the economic boom, wages evolution was far from capturing the spectacular productivity boom, which has reinforced competitivity in industry. Since a few years ago, wages increased substantially more than productivity. In 2010, wages increased by 15% in China as the result of the tightness of the labor market. We show this pattern may be inherent to the development process and is not specific to the china case. Using a panel dataset with total wage bill and value added available at the aggregate level in the manufacturing sector and also for 28 sub sectors in the manufacturing, we show the labor share follows a U-shaped relationship at the aggregate level and also within the 28 manufacturing sub sectors. This suggests the wedge between productivity and wages is observed at the desaggregate level and is not the result of composition effects as the share of each sub sector evolves along the development path.

Dualism in the organization of production activities is pervasive in developing countries (DCs), in which traditional, low-productivity methods of production coexist with higher-productivity, modern methods in urban areas. We question theoretically the impact of economic development on the labor share of income in such an environment in which a significant proportion of the economic resources remain trapped in the low-productivity traditional sector. We show that introducing firm heterogeneity and frictions on the labor markets generates a U-shaped pattern

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of the labor share as modern sector expands along the development path which is consistent with the within sector variation of the labor share we observe in data.

Traditionally, economists have devoted much attention to the pattern of income inequality despite the recent interest for the question of the labor share of income. We see at least two reasons why focusing on the labor share of income along the development path is important. First, the trade view. If wage increase does not compensate productivity gains, this could affect competitivity and net export. This argument has become very popular among politicians and, the economic profession should ask to what extent are wages connected to productivity gains in developing countries. Then, there is the inequality view. Development is often seen as a necessary condition for the well-being of people. But we also know since Kuznets [29] that the first stage of development is associated with an increase in inequalities. In this paper we focus on the labor share, since the factor distribution of income is a key component of income inequality: labor share movements can modify income inequality, in particular when the capital distribution is more concentrated than the wage distribution.[1] Most of the studies have focused on wage inequality. By contrast, little attention have been paid to the labor share. In this paper, we offer a specific channel through which development affects the labor share and inequalities as a result.

The main reason for the neglect of the labor share relies on Kaldor's stylized fact [28] in favor of constant labor shares across time and space, in spite of Solow's [43] skepticism. This fact - mainly inspired from the US experience - is contradicted by recent empirical studies. Not only has the labor share sharply decreased in many European countries in the 1980s, but it also plunged in developing countries and more particularly in least developing countries (See Decreuse and Maarek [17] or Harrison [24]). In addition, the labor share remains substantially higher in developed countries than in DCs (see Ortega and Rodriguez [34] for instance). More recently, labor share also sharply decreased in the US since the mid of the 2000's (see Rodriguez and Jayadev [27]).

This article offers several contributions. First it exploits the panel dimension of the labor share for developing countries at the aggregate and at the sector level. We use a specific dataset from UNIDO, a subdivision of the UN, which allows us to have reliable data for the labor share for developing countries at the desaggregate level and to study the long run evolution within country/sector. To our knowledge, we are the first to exploit such a dataset in order to study the long run impact of development on the labor share, which is not possible with other dataset on the labor share (see bellow). We identify a clear U-shaped pattern of the labor share at the aggregate level and at a more disaggregate level. This is consistent with what economist have recently observed for less advances economies and is also consistent with the fact labor share is higher in more advanced economies. Then, we provide a new theoretical explanation in order to explain this particular pattern of the labor share. The basic mechanism is based on firm heterogeneity in a dual labor market and frictions on the labor market. In such a framework, worker are not paid at their marginal productivity and wages rely on workers outside options which are mainly located in the traditional sector of the economy and low productivity firms. As a results, wages do not necessarily compensate productivity increases at first stages of development. This is basically the seminal ideas of lewis [32] who argue that at first stage of development, labor supply is unlimited in the modern sector of the economy: workers would accept any wages higher than equilibrium wage in the traditional sector.

The model is static and features a dual labor market with a modern and a traditional sectors as often considered in the development literature in developing countries (DCs), where traditional, low-productivity methods of production coexist with higher-productivity, modern methods in urban areas. The model also features shadow entry costs and endogenous frictions in the modern and the traditional sector and multiple applications. We now comment on each assumption separately. The model assumes there are rents in the product market, and that such rents are shared between workers and employers according to market frictions and traditional sector productivity.

[1] Checchi and García Peñalosa [13] show that the labor share is an important determinant of income inequality in OECD countries. Similarly, García Peñalosa and Orgiazzi [21] highlight the increasing role in unequal possession of capital in OECD countries. Concerning developing countries, Daudey and García Peñalosa [15] show that a larger labor share is associated with a lower Gini coefficient of personal incomes and that the effect is quantitatively large.

Rents in the product market are introduced in a simple way. Following Blanchard and Giavazzi [9], we suppose that firm entry in the modern and traditional sectors involves paying a shadow entry cost. Unlike resource costs, shadow costs imply rents that must be split between firm owners and their employees. It simply allows for superprofits for firms. Shadow costs refer to the product market regulations that limit the number of competitors at the sectoral level. It can also simply correspond to lack of resources (access to finance, educated managers....) necessary to enter the modern sector and which guaranties superprofits for incumbents. Many authors have pointed out the lack of competitions in modern sector in developing countries (Prescott and Parente [37]) regardless it results from formal barriers to entry (Acemoglu [2] or Djankov et al [19]) or from lack of ressources (La Porta and Shleifer [31]).

The labor market is characterized by frictions. Matching frictions usually characterize the labor market of developed countries. Nevertheless, estimates of the matching function show that matching frictions are also very strong in DCs (see Rama [38] for Tunisia, and Berman [10] and Yashiv [45] for Israel). Frictions together with the proportion of high productivity firms in the economy determine firms' ability to pay workers below marginal product and enjoy the rents obtained in the product market. We follow Albrecht, Gautier and Vroman [4] –thereafter AGV –who allow for wage posting, multiple applications by workers, and Bertrand competition between potential employers. In this model, individual wages depend on the number of offers the worker receives. Individuals either receive their marginal product or get paid the monopsony wage. As a result, the degree of wage competition between high productivity employers will depend on the proportion of modern firms in the economy and this determines the wedge between productivity and wages.

We use our model to predict the impact of development on the labor share. The development process is modeled through two aspects: a decrease in entry costs in the modern sector and an increase in modern sector productivity. On the one hand, the decrease in entry costs fosters competition in the goods market as new high productivity firms enter. The proportion of high productivity firm in the economy increases. We show when proportion of foreign firms is low, this tend to decrease the labor share since output increases but outside option remains trapped in low productivity firms and wage increase does not catch up productivity increases in the economy. When the proportion of modern firms is high, competition between modern firms to attach labor servives is more frequent and wages tend to increase faster than output in the economy. On the other hand, firms' productivity may increase more in the modern than in the traditional sector. The rising productivity gap between the modern and traditional sectors gives birth to two opposite effects. Firstly, the monopsony wage does not increase with productivity growth. For a given number of firms this implies that the mean wage does not increase as fast as formal productivity and the labor share goes down unambiguously. Secondly, the increase in profits induces entry of new modern firms. When proportion of modern firms is low both effects make the labor share decreases and when the proportion of modern firm is high the overall effect of an increase in productivity gap is ambiguous. As a result, at early stages of development, both increase in competition in the modern sector and the increase in productivity gap makes the labor share decreases. That allows us to explain the decrease in labor share observed in DCs and more particularly in LDCs, whose growth has accelerated in the last decades.[2] At some point, the competition effect start to dominate and the labor share rises along the development path.

This paper relates to different strands of literature. First, it belongs to the growing literature on the determinants of the labor share, as emphasized by the contributions of Bentolila and Saint Paul [8], Blanchard and Giavazzi [9], or Acemoglu and Guerrieri [1], Maarek and Orgiazzi [26], Bazillier and Najman [7], Decreuse and Maarek [17] or Rodrik [41]. None of these papers focuses on developing countries and the role of economic development in non-competitive market. However a notable exception is Gollin [22] which argues that after correcting the labor share data for self-employed workers, the link between labor share and development disappears. We argue that using more suitable data for the labor share in developing countries with time variations yields a strong correlation between development and the labor share. By correcting the labor share for income

[2]See Harrison [24]

of self employed, Gollin only compare the labor share at one point in time across a sample of countries that only include a dozen of developing economies. Our data on the the manufacturing sector does not require such a correction since self employed are excluded from the sample by UNIDO (see below).

Second, the paper is related to the literature on inequality along the development path. This literature starts with Kuznets [29], who argues that inequalities increase during the first stages of development as population shift from the agricultural sector, where incomes are more equally distributed, to the urban sector, where income are less equally distributed. During later stages of development, this force for inequality is more than offset by income within the urban sector which become more equally distributed. This idea was formalized later by Robinson [39], Knight [30], and Fields [20], who argued that the rural-urban income differential is constant and equally distributed, but the share of the population in the agricultural sector changes with development, producing the familiar inverted U-shape for evolution of income inequality over time (inequality between sectors). Nevertheless, Bourguignon and Morrisson [11] review the empirical evidence of such an inverted U-shaped relationship and show that it is not a very robust relation. This paper adopts a quite different perspective by focusing only on the labor share. As explained later, we focus on the labor share in the manufacturing sector and as a result, this work relies more on the within-sector analysis in the tradition of Kuznets.

Third, the idea that the traditional sector plays a key role in the modern sector performances is widely accepted in the literature.[3] Our framework relies on the coexistence of modern and traditional firms in a dual labor market characterized by frictions. In our model, traditional sector is residual as workers will always work in the modern sector if they get an offer. Zenou [46] and Satchi and Temple [40] make a similar assumption (in their model, traditional sector is informal and competitive) and include workforce migration in their model, following Harris and Todaro [23]. They study the impact of different labor market policies on economic outcomes in the short and medium run (taxation, minimum wage or unionization). Albrecht et al [3] follow Amaral and Quintin [5] and adopt a different perspective. In their work, formal modern and informal traditional sectors both feature frictions. Workers differ in formal sector productivity and choose whether they work in the formal sector or not. Charlot et Al [12] also consider frictions in both sectors with large firms and focus on the impact of various regulations on the size of the informal traditional sector and unemployment. Wages are negotiated in the three approaches and outside opportunities rely on the size and productivity of the traditional sector in a dual labor market. Whether the informal sector is frictional or not is not important in our paper. Our paper offers a simple and tractable model in the spirit of these various contributions to address a different problem, namely the impact of development on the labor share of income in a dual labor market.

2 Empirical Evidence

2.1 Empirical Strategy

Our empirical analysis consists in estimating a reduced form equation on sectoral panel data on the manufacturing sector. The dependent variable is the labor share and our regressor of interest is the GDP level which captures the level of development. In order to allow for a non monotonic relationship between development and the labor share we use two different approaches.

First we estimate linearly this relation on aggregate manufacturing data for 4 income classes of countries: low income countries, lower-middle countries, upper-middle countries and high income countries.[4] The estimated model is the following:

[3] See for example Harris and Todaro (1971), Mazumdar (1983), Rauch (1991), Dessy and Pallage (2003) or Straub (2005) for theoretical literature and Banerjee and Dufflo (2007) or La Porta and Shleifer (2008) for empirical literature.

[4] We use the classification of the World Bank to separate countries according to their level of development. The criterion is the Gross National Income per capita.

$$\begin{aligned} LS_{it} =& a + a_i + a_t \\ &+ \beta_1 GDP_{t-1} + \beta_2 I/Y_{it-1} + \beta_3 OPENT_{it-1} + \beta_4 OPENK_{it-1} \\ &+ \beta_5 School_{it-1} + \varepsilon_{it} \end{aligned} \tag{1}$$

where a_i and a_t are respectively country fixed effects and time dummies. We control for factors accumulation, trade and financial openness as well as the level of education. All independent variables are lagged in order to control for potential endogeneity problems which are likely to arise when examining the labor share. Using fixed effects we control for unobserved heterogeneity over time and across countries.

Second we estimate the relation between development and the labor share on developing countries only, allowing for a non linear relationship between the two by including in our regression the square of GDP:

$$\begin{aligned} LS_{it} =& a + a_i + a_t \\ &+ \beta_1 GDP_{t-1} + \beta_1 GDP_{t-1}^2 + \beta_3 I/Y_{it-1} + \beta_4 OPENT_{it-1} \\ &+ \beta_5 OPENK_{it-1} + \beta_6 School_{it-1} + \varepsilon_{it} \end{aligned} \tag{2}$$

Since we focus on the effect of development on the labor share we have to take into account that development is likely to modify the productive structure of the economy. Indeed, development is an unbalanced process where some sectors develop whereas others shrink as Kuznets [**?**], [**?**] shows. It is common to observe that development is accompanied by an increase of the industrial sector and a decrease of the agriculture one which can be due either to demand effects such as non homothetic preferences or to supply effects. There is no reason why these effects should not be at play also within the manufacturing sector so we have to wonder if an observed change in the labor share reflects structural effects or changes in the sharing of the value added within sectors.
For that, let's recall that the labor share in a country i at time t is the sum of the sectoral labor shares $LS_{i,t,s}$ weighted by the sectoral shares $\phi_{i,t,s} \equiv y_{i,t,s}/y_{i,t}$, that is:

$$LS_{i,t} = \sum_{s=1}^{n} \phi_{i,t,s} LS_{i,t,s}.$$

We can decompose the aggregate variation of the labor share between time t and time $t-1$ into a within term and a composition term as follows:

$$\Delta LS_{it} = \underbrace{\sum_{s=1}^{n} (LS_{i,t,s} - LS_{i,t-1,s})\phi_{i,t-1,s}}_{\text{within effect}} + \underbrace{\sum_{s=1}^{n} (\phi_{i,t,s} - \phi_{i,t-1,s}) LS_{i,t,s}}_{\text{composition effect}}, \tag{3}$$

where the operator Δ stands for the first order difference operator between t and $t-1$.
Two terms appear. The first one represents the within effect and equals the sum of the variations of the labor share within each sector, weighted by the initial sector share. This corresponds to the "real variation" of the labor share. The second term corresponds to what we call the "composition effect" and equals the variation of the share of each sector in the economy, weighted by the final value of the labor share. This term captures the extent to which the variation in the aggregate labor share is due to changes in the structure of the manufacturing sector.

We are interested in the within effect that development has on the labor share. Indeed we want to see how the sharing of the value added process is impacted by development. Consequently we also perform estimations on sectoral data controlling for country*sectors fixed effects.

The estimated model is the following :

$$
\begin{aligned}
LS_{its} =& a + a_{is} + a_t \\
&+ \beta_1 GDP_{i,t-1} + \beta_2 GDP^2_{i,t-1} + \beta_3 I/Y_{i,t-1,s} \\
&+ \beta_4 OPENT_{i,t-1} + \beta_5 OPENK_{i,t-1} \beta_6 School_{i,t-1} \varepsilon_{its}
\end{aligned} \tag{4}
$$

where a_{is} is a country*sectors fixed effects and a_t is a time dummy.[5] Since we add a dummy for every sector in each country we control for a potential modification of the structure of the economy. Therefore the coefficients β_1 and β_2 reflect the effect of output on the labor share within sub sectors. Indeed, including these dummies allow us to control for *individual* heterogeneity and so to perform within estimations which allows us to observe deviations from the mean of the labor share within the individual dimension.

Alternatively, in order to eliminate the effect that development may have on the structure of the manufacturing sector which in turn is likely to impact the level of the labor share we performe estimations on every sub sector separately.

2.2 Data

We compute the labor share using the UNIDO data which covers 180 countries over the period 1963-2003. This database provides various variables at the aggregate manufacturing level, as well as at 3 digit level for 28 sectors.[6] The UNIDO data mainly comes from industrial surveys which are sent by UNIDO to the country statistical offices. The labor share is defined as the ratio of wages and salaries over value added.[7]

As argued by Gollin [22] this definition implies that all the income of the self-employed is treated as capital income which underestimates the labor share. This is particularly problematic in our study because it could bias the impact of development. Indeed during development the share of population being self-employed declines which implies that the overall wage bill increases. Therefore using UN data and the naive definition of the labor share above may lead us to mistakenly interpret an increase in the labor share as a change in the sharing of value added. On the contrary data from UNIDO allow us to avoid this problem. Indeed, the surveys sent by UNIDO are designed to collect data only in the *corporate* manufacturing sector and specify a cut-off point below which economic activity is not measured. [8] Consequently this selection removes, to a large extent, the problem of self-employment.

We could have chosen to use another database which takes into account the self-employed, for example the UN data, and adjust the labor share for self-employment income as suggested by Gollin [22]. However, there would have been major problems. First, self-employment income is available for very few developing countries. Second, the availability is restricted to very few years, which does not allow for time comparisons. For instance, Gollin is able to correct the naive definition of the labor share by taking into account self-employment income for only 12 developing countries at one point of time only. Third, there are several competing methods to correct for self-employment income, which are not totally satisfying and which lead to different measures (sometimes aberrant) of the labor share. Finally, UNIDO data is available at a disaggregated level for a larger panel of developing countries, and for a longer period than other data on developing countries.

[5] Note that due to a lack of data for developing countries, the only sectoral explanatory variable we dispose of is investment over value added (IY) which is a proxy for capital accumulation.

[6] The sectors are: Food products; Beverage; Tobacco; Textile; Wearing apparel, except footwear; Leather products; Footwear, except rubber or plastic; Wood Products; Furniture, except metal; Paper and products; Printing and publishing; Industrial chemicals; Other chemical; Petroleum refineries; Misc. petroleum and coal products; Rubber products; Plastic products; Pottery, china, earthenware; Glass and products; Other non-metallic mineral products; Iron and steel; Non ferrous metal; Fabricated metal products; Machinery, except electrical; Machinery, electric; Transport equipment; Professional and scientific equipment; Other manufactured products.

[7] See Appendix for a more precise definition of these variables.

[8] The cutoff can change between countries. For example, in developing countries, firms with less than five employees are not covered. In the US, the requirement is that establishments must have at least one paid employee.

Of course our approach has major drawbacks. First we examine the effect of development only on the manufacturing sector and not on the whole economy. Second, self-employment represents a large share of the population in the developing world which we do not observe. Nevertheless, as stressed above, using another database including self-employment income we would have forced us to correct the naive definition of the labor share which is, once again, at best prone to measurement inconsistencies, at worst not possible for many countries. In a word our approach is less ambitious but not subject to any measurement problems.

A problem of the UNIDO data that we have been faced with is that the way in which the manufacturing sector is desaggregated in subsectors can change over time and countries. For instance in France in 1979, sectors 311, 313 and 314 are distinct but in 1980, sectors 313 and 314 are merged into sector 311. We will simply do not perform any regression of the labor share for the country-year in which this happens, since an observed sectoral variation of the labor share over time could simply reflect the merge of two sectors.
The data comprises a panel dataset of almost one hundred countries where the labor share of the whole manufacturing sector is available at least once, around 60% of them being developing countries.

We include a number of control variables suggested by the previous literature. First we control for capital accumulation since it is the only determinant of the labor share when factors are paid their marginal product. Moreover it allows us to test for the capital-accumulation channel of development in the case of non-Cobb-Douglas function. Indeed, if the elasticity between labor and capital is different from one, capital or human capital accumulation changes the level of the labor share even in a competitive context. For that we use the ratio of gross fixed capital formation to value added as a proxy for capital-output ratio. Gross fixed capital formation and value added both come from the UNIDO dataset. We also add an education variable to control for human capital accumulation all the more so as there is empirical evidence of a positive link between education and the labor share, at least for OECD countries, see Daudey and Decreuse [15]. We use as a proxy of human capital the average schooling years in the total population aged 25 and over (see Barro and Lee [6]).

The second kind of control variables we use, namely trade and financial openness, are related to globalization. As mentioned above, various studies have shown that those variables are negatively correlated to the labor share, see Rodrik [41], Harrison [24], Jayadev [25] and Ortega and Rodriguez [33]. Therefore, omitting openness variables would potentially create endogeneity problems since openness may be related to development. We use as a proxy for trade openness the ratio of import plus export to GDP for the whole economy from the World Bank available from 1960 to 2006 for more than 200 countries. To measure financial openness we use the de jure index of Chinn and Ito [14] which captures how policies are restrictive toward capital flows. It is a continuous composite index available from 1960 to 2006 for more than 200 countries.

2.3 Econometric Analysis

Our first specification, equation (1) regresses the labor share on the level of GDP for different classes of income and equation (2) regresses the labor share on the level of GDP and on its squared. Both are estimated at the aggregate level, that is at the level of the manufacturing sector as a whole. Our controls are capital accumulation (IY), education ($School$), financial openness ($OPENK$) and trade openness ($OPENT$). Note that all control variables are included at date $t-1$, as treatment for endogeneity. Results are reported in table 2.3.

Results presented in the four first columns of table 2.3 show that development has a significant negative impact on the labor share for low income whereas it significantly increases the labor share in upper middle and high income economies. That means that development has a negative impact on the labor share at very early stages and then a positive one when economy develops. The last column of table 2.3 reports the results of the specification presented in equation 2 which confirm the U-shaped relationship between development and the labor share which are suggested in the

Table 1: Labor share and development : aggregated data

	Low income	Low-middle	Upper-middle	High income	DCs
GDP	-15.86^{***}	-2.15	23.06^{***}	5.98^{**}	-119.31^{***}
	(3.93)	(3.02)	(4.94)	(2.95)	(22.33)
GDP^2	.	.	.	.	7.59^{***}
					(1.41)
I/Y	3.37^{***}	1.17	5.93	26.11^{***}	2.12^{**}
	(0.89)	(1.10)	(6.60)	(5.88)	(0.83)
OPENT	-0.253^{***}	0.018	-0.029	-0.274^{***}	-0.043
	(0.05)	(0.044)	(0.040)	(0.053)	(0.026)
OPENK	3.27^{***}	1.94^{**}	-0.645	0.042	1.27^{**}
	(1.10)	(0.89)	(0.709)	(0.477)	(0.53)
dummies	yes	yes	yes	yes	yes
R^2 (within)	0.529	0.310	0.341	0.227	0.262
nb countries	18	23	19	26	60
nb observations	164	320	204	460	688

Robust standard errors between brackets.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
All regressions include country and time fixed effects.

4 first columns. Indeed, both coefficients on GDP and on its squared are significant, the former being negative and the latter being positive.

Figure 2.3 plots the relationship between development and the labor share in developing countries presented in the last column of 2.3. More precisely, the vertical axis is $LS_{it} - a_i - a_t - X_{it}$ and the horizontal one is GDP_{it} where X_{it} stands for a vector of control variables presented in equation 2.

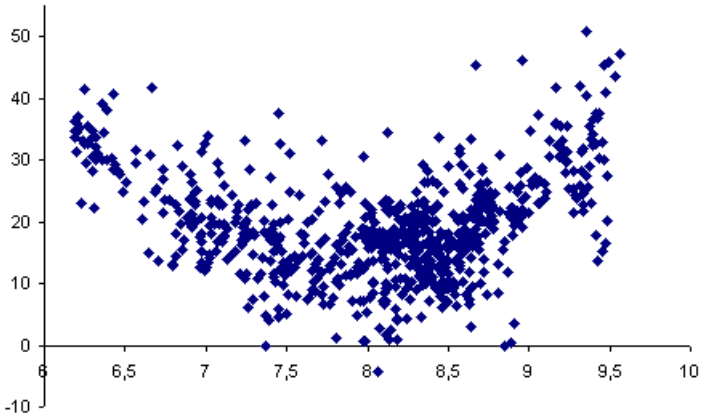

Figure 1: Labor share and development: the Kuznets hypothesis

We next turn to estimations on sectoral data (i.e., the 28 manufacturing sub-sectors), and estimate the model described by equation (4). Once again we regress the labor share on GDP and its squared to see the impact of development on the sharing of the value added. As explained in subsection 2.1, controlling for country*sector fixed effects allow us to control for individual heterogeneity which permits to clean the effect that structural changes may have on the labor share when the economy develops. Results are reported in table 2.

We can derive several lessons from those regressions. First the coefficients of GDP and of GDP^2 are respectively significantly negative and significantly positive which confirms our previous results on a U-shaped relationship between development and labor share on aggregate data. Second, since we control for country*sector fixed effects, we observe a within effect which means that the reason

Figure 2: Labor share and development: sectoral data on developing countries

	(1)	(2)	(3)	(4)	(5)	(6)
GDP	-78.78**	-78.80**	-82.89***	-103.64***	-103.05***	-105.63***
	(33.46)	(33.46)	(30.80)	(30.70)	(32.38)	(30.70)
GDP^2	5.11***	5.11***	5.46***	6.60***	6.57***	6.76***
	(1.93)	(1.93)	(1.80)	(1.80)	(1.88)	(1.79)
I/Y		-0.00**	-0.00**	-0.00*	-0.00	-0.00
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
$OPENT$			-0.06	-0.04	-0.04	-0.05
			(0.07)	(0.07)	(0.08)	(0.08)
$OPENK$				2.66***	2.66***	2.49***
				(0.74)	(0.74)	(0.71)
$School$					0.28	0.51
					(1.61)	(1.58)
Constant	327.01**	327.05**	340.59**	430.38***	426.34***	395.15***
	(147.06)	(147.06)	(134.73)	(133.91)	(147.26)	(144.31)
R-squared	0.25	0.25	0.26	0.26	0.26	0.06
Nb of Observations	11685.00	11685.00	11562.00	11562.00	11562.00	11562.00

Clustered standard errors in brackets.
$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Regressions (1) to (5) include time fixed effects and country-sector crossed fixed effects
Regression (6) include time fixed effects, country fixed effects and sector fixed effects

why development impacts the labor share is not due to composition effects. Third we observe that adding our control variable increases the size of the effect of development. That means that the effect that development has on the labor share is not due to factor accumulation, as the neoclassical theory suggests, nor to openness which is one of the best candidate to the observed decline/changes of the labor share in the literature. Moreover the effect that development has on the labor share is even stronger when controlling for openness.

Note that the coefficient on capital intensity is equal to zero which suggests that empirical evidence on the link between capital accumulation and the labor share captures the effect of development *per se* and that the channel of capital accumulation is not valid. Concerning education, the coefficient is positive but not significant. Financial openness has a sign which is not in line with the studies of (see Harrison [24] and Jayadev [25]).

Lastly, as expected, trade openness has a significant negative impact on the labor share, in line with Ortega and Rodriguez [33].

Now we turn to the 28 regressions performed on each sub sectors. Results are presented in tables 2, 3, 4 and 5 and 6. One fourth of the sub sectors exhibit a significant U-shaped relationship between GDP and the labor share. We can also observe this U-shaped relationship in sixty percent of the sub sectors although not significantly. Only 4 sub sectors are characterized by a inverted U shaped relationship.

To conclude, we provide empirical evidence on a U-shaped relationship between development and the labor share within sectors which is neither related to factor accumulation nor to openness.

Table 2: Labor share and development in developing countries : regressions within each sector

Sectors	S311	S313	S314	S321	S322	S323
GDP	-125.41***	-111.69**	-391.77	6.21	-297.64	506.48
	(44.45)	(44.88)	(256.28)	(349.23)	(286.13)	(762.98)
GDP^2	8.10***	6.45**	25.16	4.53	12.18	-28.23
	(2.63)	(2.75)	(16.43)	(20.70)	(16.32)	(45.12)
I/Y	-0.83	4.35**	-0.51	-42.85	-51.58**	-1.60
	(1.40)	(2.00)	(8.19)	(44.25)	(19.94)	(3.20)
$OPENT$	-0.05	-0.01	-0.76	0.06	1.30	-0.90
	(0.10)	(0.05)	(0.60)	(0.38)	(1.36)	(0.58)
$OPENK$	2.70**	0.13	-1.16	14.30	7.99	-3.09
	(1.22)	(0.73)	(1.89)	(14.47)	(8.73)	(8.90)
School	-0.13	0.68	5.00	-5.39	-14.58	23.10
	(2.91)	(2.36)	(5.93)	(11.60)	(20.47)	(23.38)
Constant	491.30***	478.68**	1497.48	-167.73	1948.36	-2380.35
	(179.49)	(183.48)	(973.97)	(1422.50)	(1685.44)	(3313.72)
R-squared	0.62	0.70	0.20	0.38	0.18	0.15
Nb of Observations	456.00	437.00	404.00	441.00	400.00	398.00

Clustered standard errors in brackets.
$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

All regressions include time fixed effects and country fixed effects

3 The Model

The paper aims at constructing a model able to explain the impact of development on the labor share in developing countries. The labor market is dual with a modern sector with high productivity firms and a traditional sector with low productivity firms as often considered in the development literature. Modern firms benefit from technological advance and can derive an extra monopsony power on the labor market due to the fact that outside options of workers rely mostly on low productivity firms in the traditional sector. In this model, development of the modern sector along the development path generate a u-shaped relationship between development and the labor share.

3.1 Environment

We use a static matching model with entry costs in the goods market in the spirit of Daudey and Decreuse [15] or Decreuse and Maarek [17]. Our model differs in two aspects. First, we introduce a traditional sector specific to DCs. Then we study the implication of the modern sector development through two different channels: an increase in modern sector productivity relative to the traditional sector productivity and a decrease in costs to enter the modern sector. There are a continuum of workers normalized to one and a continuum of firms of endogenous mass. Workers are homogenous; firms are not: modern and traditional firms differ.

Each firm, modern or traditional, is endowed with a single job slot. Modern firms are more productive than traditional firms: the amount of output produced by a modern and a traditional firms are respectively y_M and y_T with $y_M > y_T$. The productivity differential may reflect several features of modern firms. First, modern firms may benefit from better technology. Second as noted by La Porta and Shleifer [31], modern firms (in the formal sector) benefit from better access to finance, have much better educated managers and operate on different market than traditional firms (which are often in the informal sector). As noted by la Porta and Shleifer [31], modern firms are much bigger than traditional firms. Nevertheless, including the large firm dimension in a matching model would make the model much more complicated and would not change the nature

Table 3: Labor share and development in developing countries : regressions within each sector

Sectors	S324	S331	S332	S341	S342	S351
GDP	-197.00	-93.71	-293.71***	-140.45**	-282.58	-178.68
	(168.75)	(67.17)	(60.05)	(66.71)	(177.53)	(107.90)
GDP^2	12.68	6.93	18.39***	8.33**	18.85*	11.28*
	(9.95)	(4.39)	(3.59)	(3.86)	(11.05)	(6.64)
I/Y	-0.50	-0.81	-2.87	0.82	-42.74	0.24
	(0.33)	(2.02)	(3.02)	(0.90)	(38.95)	(0.43)
$OPENT$	-0.12	-0.10	-0.26***	-0.14	-0.04	-0.23
	(0.08)	(0.08)	(0.07)	(0.10)	(0.18)	(0.18)
$OPENK$	0.48	-0.40	-0.09	4.63	0.47	6.32*
	(1.95)	(1.56)	(1.34)	(3.36)	(1.18)	(3.30)
School	4.84*	-0.67	-1.13	-3.92	-12.49	-4.27
	(2.66)	(4.04)	(3.76)	(3.43)	(10.88)	(5.08)
Constant	775.43	326.89	1157.01***	586.67**	1189.69	792.45
	(720.04)	(265.38)	(243.11)	(276.67)	(800.15)	(485.59)
R-squared	0.50	0.55	0.66	0.39	0.43	0.26
Nb of Observations	395.00	446.00	397.00	439.00	417.00	428.00

Clustered standard errors in brackets.
$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

of our results.

Firm entry involves paying a cost that is proportional to expected output. This cost can receive several interpretations. On the one hand, it can correspond to the purchase of capital units prior to searching for a worker. On the other hand, it can be due to the regulation that limits the number of firms and guarantees superprofits for the firms managing to enter. Blanchard and Giavazzi [9] consider such shadow costs to ensure that pure profits are not dissipated in entry costs. Capital costs and superprofits are part of value added and do not coincide with labor income. Entry costs cannot correspond to expenses in intermediary goods (that would be subtracted from value added) or to wage payments (that would enter the wage bill). We will give much larger interpretation on such a shadow cost later in the paper when we will focus on the impact of development.

The cost per unit of output depends on whether the firm is modern or traditional. Modern firms pay c_M, whereas traditional firms pay c_T. Modern firms face higher costs than traditional firms, that is $c_M > c_T$. The entry cost differential $c_F - c_I$ is due to extra entry difficulties for firms to enter the modern sector. Modern production sector often requires to comply with various regulations on the good and labor market, to adapt the product to norms and legislations and a more complex production process with more partner for instance which take time to deal with before starting production. This explains the extra cost firms have to incur to enter the modern sector.

The labor market features matching frictions and is not segmented. Workers and vacancies meet according to the function $M = M(u, n)$. Here u stands for the effective number of job-seekers and n stands for the number of vacancies. The meeting technology M is homogenous of degree one to ensure that the unemployment rate does not depend on the number of traders in the economy. It is also strictly increasing in both arguments, strictly concave, and bounded by $\min\{u, n\}$. According to La Porta and Djankov (2010), workers in the modern (formal) and traditional (informal) sectors are not different with respect to observed skills and other observable characteristics. Only managers/entrepreneurs differs and are much more educated in the modern sector. This is the reason why we do not consider a specific labor market for the traditional sector.

Each worker is endowed with two search units—two applications—and so $u = 2$. The probability for a worker to receive an offer per search unit is $M(2, n)/2 = m(n)$; it is increasing in n. Similarly, $2m(n)/n$ is the probability of a firm finding a worker; it is decreasing in n.

Table 4: Labor share and development in developing countries : regressions within each sector

Sectors	S352	S353	S354	S355	S356	S361
GDP	-67.71	139.34	-30.73	-57.37	-147.90***	-125.05
	(64.77)	(194.13)	(75.17)	(68.04)	(42.29)	(114.68)
GDP^2	4.50	-9.33	1.88	4.24	9.09***	7.71
	(3.86)	(12.21)	(4.80)	(4.21)	(2.50)	(6.97)
I/Y	3.09	6.45**	2.59*	4.07***	1.26	-0.00*
	(3.47)	(3.03)	(1.27)	(1.36)	(1.79)	(0.00)
OPENT	-0.08	0.24	-0.18	-0.14	-0.14**	0.06
	(0.06)	(0.26)	(0.12)	(0.10)	(0.06)	(0.09)
OPENK	2.10	1.03	1.94	3.50**	1.87	0.23
	(1.56)	(1.35)	(1.64)	(1.47)	(1.59)	(1.69)
School	1.47	3.50	4.65	1.87	1.45	0.84
	(2.81)	(5.76)	(2.78)	(3.44)	(3.08)	(2.14)
Constant	244.75	-557.49	148.41	228.57	626.83***	515.13
	(280.76)	(787.68)	(289.40)	(264.38)	(192.69)	(482.41)
R-squared	0.52	0.49	0.52	0.60	0.32	0.53
Nb of Obs.	393.00	357.00	272.00	408.00	398.00	359.00

Clustered standard errors in brackets.
$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Firms set wages. If a worker receives a unique offer, then s/he is paid the monopsony wage. This monopsony wage is equal to the value of nonmarket opportunities. Without loss of generality the value of nonmarket opportunities is normalized to zero, and so the monopsony wage is zero.[9] If a worker receives two offers, one from each application, then firms enter Bertrand competition to attach labor services. In such a case, wages can be easily computed. The probability that a worker receives a single job offer is $2m(n)(1-m(n))$. The wage is then nil and the firm gets the whole output. The probability of receiving two offers is $m(n)^2$. The wage then depends on the productivity of both firms. Let ρ denote the proportion of modern firms in the economy. With probability $(1-\rho)^2$, the two offers are from traditional firms and the worker receives output y_T. With probability $\rho(1-\rho)$, one of the offers comes from a modern firm and the other comes from a traditional firm. The worker is then hired by the modern firm and his wage is y_T. The firm gets the difference $y_M - y_T$. With probability ρ^2, the two offers come from foreign firms. The worker then obtains the marginal product y_M. Indeed, a firm unable to attract any worker cannot produce but has already paid the entry cost. Albrecht et al [4] provide a microfoundation for such an equilibrium wage structure in a model in which firms post wages and workers have multiple applications (here, we have only two applications). Robin and Postel Vinay [36] argue that important part of wage dispersion can't be explain by firms or employers characteristics.

In developing countries, an important share of traditional firms are not registered as formal but compete with formal traditional firm. Our goal is not to explain the size of informal sector in the economy but it's important to take this feature into account in our model since informal firms do not enter in the wage bill and output statistics. We simply assume that a share δ of traditional firms are informal. This is consistent with evidence La Porta and Shleifer (2010) provide using the enterprise survey of the world bank which clearly show there exists a huge heterogeneity in productivity in the formal sector in developing countries but the average productivity of the formal sector is substantially higher than in the informal economy mainly composed of traditional firms. We not considered firm heterogeneity within modern, tradition or informal sector. It would not change the results.

[9] What matters here is that the monopsony wage is lower than the marginal productivity of labor. Thus there is a wedge between the maximum wage firms are willing to pay and the minimum wage that workers are ready to accept. In a dynamic setting, the monopsony wage would be equal to the endogenous reservation wage.

Table 5: Labor share and development in developing countries : regressions within each sector

Sectors	S362	S369	S371	S372	S381	S382
GDP	-73.48	-81.91	-294.89	-191.36	-150.35**	-6.31
	(84.63)	(54.46)	(206.68)	(262.38)	(60.93)	(96.66)
GDP^2	3.83	5.48*	16.11	10.57	9.48**	1.30
	(5.60)	(3.22)	(13.54)	(16.80)	(3.66)	(5.57)
I/Y	7.11	1.73*	0.29	-0.60	2.14	-1.54
	(6.72)	(0.89)	(2.93)	(0.94)	(2.64)	(3.59)
$OPENT$	0.11	-0.06	0.90	0.65	-0.12	-0.12
	(0.25)	(0.07)	(1.14)	(0.71)	(0.09)	(0.13)
$OPENK$	5.37	1.42	2.56	1.08	2.21*	1.98
	(4.21)	(0.95)	(2.03)	(2.20)	(1.28)	(2.14)
School	4.83	2.05	-17.37	-18.75	0.04	-5.42
	(7.85)	(2.65)	(20.04)	(12.06)	(2.85)	(5.97)
Constant	305.76	301.90	1223.77	1069.68	611.35**	40.89
	(346.68)	(232.34)	(786.40)	(940.33)	(239.72)	(393.12)
R-squared	0.23	0.69	0.28	0.28	0.66	0.50
Nb of Observations	366.00	398.00	382.00	328.00	441.00	384.00

Clustered standard errors in brackets.
$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In such a framework, traditional or informal sector can be considered as a residual sector in which workers search for a job due to the lack of opportunities in the modern and formal sector. This is consistent to the view of the informal sector composed of traditional archaic firms expressed in La Porta and Shleifer [31] that argue workers observed characteristics does not differ in the formal and the informal economy but the wage gap remains high. In our model, workers work in the traditional firms only if he does not have any job offer in the modern formal sector. Satchi and Temple [40] and Zenou [46] also makes a very similar assumption to ours that a worker who does not find any offer in the (frictional) formal (and modern) sector works in the (competitive) informal sector. The implicit assumption in their papers is that the labor market in the informal sector is perfect and hence worker can automatically find a job in this sector. We also assume traditional or informal sector is more competitive than formal sector since entry cost per unit of output is higher in the modern sector $c_M > c_T$ but there still exists frictions in this sector. Assuming a competitive traditional sector would require no cost of posting a vacancy. This would not alter the results.

In our model, frictions in the modern sector parameterize the size of the traditional (and the informal sector). Satchi and Temple [40] calibrate a matching model à la Mortensen and Pissarides [35] and generate an informal sector corresponding to 30% of the urban workforce. Nevertheless, they consider that in the Nash bargaining process, worker takes out 70% of the surplus of the match in order to limit job creation in the formal sector. This assumption, as they note, seems unrealistic as the labor share in DCs is low. We focus on (shadow) entry costs to explain the important size of the informal sector.

3.2 Labor market equilibrium

Expected profits for the two types of firms are

$$\pi_M = -c_M y_M + \frac{2m\,(n)}{n}\left[(1-m(n))\,y_M + m(n)(1-\rho)(y_M - y_T)\right], \quad (5)$$

$$\pi_T = -c_T y_T + \frac{2m\,(n)}{n}\left[1-m(n)\right] y_T. \quad (6)$$

Table 6: Labor share and development in developing countries : regressions within each sector

Sectors	S383	S384	S385	S390
GDP	-69.25	-198.36*	41.38	-97.50
	(51.57)	(117.21)	(222.23)	(88.41)
GDP^2	5.13	13.98*	-2.21	5.73
	(3.24)	(7.37)	(13.16)	(5.31)
I/Y	3.02*	-7.45	2.01	-2.07
	(1.52)	(4.99)	(2.09)	(1.45)
$OPENT$	-0.24***	-0.23	-0.57*	-0.02
	(0.09)	(0.14)	(0.30)	(0.10)
$OPENK$	2.95***	0.56	6.87	1.42
	(0.86)	(1.74)	(4.96)	(1.07)
School	-1.03	-1.80	16.45	3.67
	(2.80)	(4.17)	(13.74)	(2.62)
Constant	263.91	703.67	-166.65	406.13
	(205.78)	(444.94)	(970.70)	(364.66)
R-squared	0.71	0.23	0.30	0.51
Nb of Observations	403.00	397.00	350.00	408.00

Clustered standard errors in brackets.
$p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Firms enter the economy until profits cover the costs. In equilibrium we have $\pi_I = \pi_F = 0$ and so

$$c_M = \frac{2m(n)}{n}\left[1 - m(n) + m(n)(1-\rho)\frac{y_M - y_T}{y_M}\right], \quad (7)$$

$$c_T = \frac{2m(n)}{n}\left[1 - m(n)\right]. \quad (8)$$

These two equations simultaneously define ρ, the proportion of modern firms, and n, the total number of firms in this economy. The system can be solved recursively. The free-entry condition (8) for the traditional firms determines the total number of firms n. The free-entry condition (7) then determines the proportion of modern firms ρ. The facts that $c_M > c_T$ and $y_M > y_T$ imply that there exists a unique equilibrium with a non-trivial proportion of modern firms.

The reason why the total number of firms depends only on the effective entry cost faced by traditional firms is the following. If c_M decreases, then profits for modern firms become positive; new formal firms enter as a result. Since c_T remains constant, profit expectations for traditional firms become negative because they find it more difficult to recruit a worker. The number of traditional firms goes down until the total number of firms returns to its initial value.

Changes in modern firms' entry cost c_M do not modify the total number of firms; they increase the proportion of modern firms—applying the implicit function theorem to equations (7) and (8) shows that $dn/dc_M = 0$ and $d\rho/dc_M < 0$. An increase in productivity gap $(y_M - y_T)/y_M$ has similar effects to a fall in modern firms' entry cost c_M: it increases the proportion of modern firms, but it does not impact the total number of firms.

Entry cost corresponds to surplus you derive on the good market in such a framework. At this stage, (shadow) entry cost can receive an extra interpretation. It can simply corresponds to all factors that affect the degree of competition and rents in the modern sector. It can corresponds as stated before to regulatory barriers (shadow cost) that limit the number of firms in the modern sector and guarantee superprofits to a reduce number of entrepreneurs. Those regulatory barriers are very important in developing economies and are often introduced in order to give rents to politically connected entrepreneurs and to politicians (elite). Djankov et al [19] provide evidence of such barriers to entry in developing economies and argue they are consistent with public choice theories of regulation since they do not seems to correct any market failure. On the other hand,

shadow entry cost can also corresponds to lack of resources that limit the size of modern sector. For instance low financial development limit the ability of entrepreneurs to obtain loan and to develop big, complex and highly productive firms in the modern sector (see Straub [44] for instance). Or, technology used in the modern sector is highly complement with human capital and education which is not very abundant in developing economies (see Dessy and Pallage [18] for instance). La Porta and Shleifer [31] show that large formal modern firm are run by much more educated managers than smaller informal firms whereas workers have pretty much the same observed characteristics in the modern and the traditional sector. They suggest that development goes together with the availability of high skilled entrepreneurs able to run large and high productivity firms in the modern sector. In such view, shadow entry cost can be interpreted as a lack of resources that makes the competition weak in the modern sector and garantee superprofits.

3.3 Labor share

The total wage bill paid by modern firms is

$$W_M = m\left(n\right)^2 \rho \left[\rho y_M + 2(1-\rho) y_T\right]. \tag{9}$$

The wage bill corresponds to workers who receive two offers. This event happens with probability $m(n)^2$. With probability ρ^2 the two offers are from modern firms and the worker receives the totality of output y_T. With probability $2\rho(1-\rho)$, one of the two offers is from a traditional firm and the worker gets y_T.

The total wage bill paid by traditional firms is

$$W_T = m\left(n\right)^2 (1-\rho)^2 y_T. \tag{10}$$

Wages correspond to workers who receive two offers from traditional firms.

Total output in modern firms is

$$Y_M = m\left(n\right) \rho \left[2 - m\left(n\right) \rho\right] y_M. \tag{11}$$

The probability that a worker does not receive a job offer from a modern firm is $(1-m(n)\rho)^2$; the probability that a worker receives an offer from such firms is $1-(1-m(n)\rho)^2$. However, the worker may receive two offers from such firms with probability $m(n)^2\rho^2$. In this case only one of the firms hires him/her. We therefore subtract $m(n)^2\rho^2$. The result follows.

Total output in traditional firms is

$$Y_T = m\left(n\right)(1-\rho)\left[2 - m\left(n\right)(1+\rho)\right] y_T. \tag{12}$$

The total wage bill in national account statistics is $W = W_M + \delta W_T$, whereas total output is $Y = Y_M + \delta Y_T$. This is due to the fact that many firms in the traditional sector are not registered and do not appear in official staistics. We obtain

$$\mathrm{LS} = \frac{W}{Y} = \frac{m\left(n\right)\left[\rho^2 y_M + 2\rho(1-\rho) y_T\right] + m\left(n\right)\delta(1-\rho)^2 y_T}{\rho\left[2 - m\left(n\right)\rho\right] y_M + \delta(1-\rho)\left[2 - m\left(n\right)(1+\rho)\right] y_T}. \tag{13}$$

3.4 Impact of development on the labor share

In our mind development goes together with development of the modern sector as noted by La Porta and Shleifer [31]. Two essential features characterize development:

- A decrease in rent in the modern sector: (i) regulatory barriers to entry in the modern sector tend to decrease with development as suggested by Djankov et al [19] or Parente and Prescott [37]. (ii) the availability of resources such as educated managers able to run large and complex firms and, more broadly, to take advantage of the modern sector technology or financial development should increase the number of firms in the modern sector. This corresponds in our model to a decrease in shadow entry costs c_M which parametrize the amount of rents and the degree of competition regardless it comes from formal barriers to entry or a lack of resource availability.

- An increase in the productivity gap between modern and traditional sector since modern sector should benefit more from technological change and productivity gain resulting from better institutions.

According to the free-entry conditions (7) and (8), changes in modern firms' entry costs only lead to changes in the proportion ρ of modern firms in the total number of firms. To capture the impact of a decrease in modern sector entry cost, we only need to differentiate LS given by equation (13) with respect to ρ. We obtain:

$$\frac{d\text{LS}}{d\rho} \overset{sign}{=} -dY/d\rho \times \text{LS} + dW/d\rho$$

Two opposite forces are involved: (i) the first term simply show that at given wages an increase in the proportion of modern firms lower the labor share since total output increases. This is the case if no modern firms compete to attract labor services. (ii) The second term correspond to the increase in wages due to the entry of modern firms in the economy as this increase the probability modern firms compete to attach labor services. At given output, this increases the labor share.

The impact of modern firms' shadow entry cost on the labor share results from the interplay between these two forces. We have

$$\frac{d\text{LS}}{d\rho} \overset{sign}{=} \rho^2 y_M - (1-\rho)^2 y_T. \tag{14}$$

if $y_M - 2y_T + z\delta + m(n)y_T - m(n)y_T\delta > 0$. This condition is likely to be satisfied. When $\delta = 1$ it's clearly satisfied. Hence, $d\text{LS}/d\rho$ is non-monotonic in ρ. It decreases at first, then reaches a minimum, and finally increases. Initially, the labor share will decrease with the development of the modern sector: development of the modern sector increases output more rapidly than wages since much of outside options of workers are located in the traditional sector. At a larger proportion of modern firms, wages increase more rapidly than output since wage competition between modern firms become much more frequent. The threshold proportion of modern firms ρ^* below (above) which modern sector development (improves) the labor share results from $d\text{LS}/d\rho = 0$. We find $\rho^* = [1 + (y_M/y_T)^{1/2}]^{-1}$.

The pattern of the labor share with respect to the proportion of modern firms reflects the pattern of productive heterogeneity among firms. The labor share is the same when there are no modern firms (c_M sufficiently large, which implies that $\rho = 0$) and when output is only produced by modern firms ($c_T = c_M$, which implies that $\rho = 1$). For these two extreme cases, LS$= m(n)/[2 - m(n)]$.

The second channel through which development could affect the labor share is a modification in the wedge between modern sector productivity and traditional sector productivity $(y_M - y_T)/y_M$. The impact on the labor share is more ambiguous. On the one hand, at given proportion of modern firm ρ, an increase in the productivity gap clearly decreases the labor share of income since $\partial LS/\partial(y_M - y_T)/y_M$. Indeed, productivity increases for all modern firms but many does not increase wages since outside option remain the same. One the other hand, the increase in productivity gap $(y_M - y_T)/y_M$ increases expected profit for firms in the modern sector and the proportion of modern firm ρ increases. When ρ is low, at first stages of development. Both effects go in the same direction and the impact on the labor share is clearly negative. When ρ is high, the impact is ambiguous since both forces go in the opposite direction. Note that $\rho^* = [1 + (y_M/y_T)^{1/2}]^{-1}$ the threshold proportion of modern firms in the economy above which an increase in ρ is decreasing in productivity differential. Thus, this negative impact of productivity gap $(y_M - y_T)/y_M$ between the modern and the traditional sector could have played at first stages of development and could contribute to explain the strong decreasing labor share for low income economies during the development process.

4 Conclusion

We highlighted a strong correlation between development and the labor share of income, at the aggregate manufacturing level but also at the disaggregate level, within manufacturing subsector suggesting this correlation is not due to reallocation forces across sectors. We also control for factor accumulation in order to understand if evolution of the labor share during the development process could be related modification in factor intensity in competitive markets. This does not affect the U-shaped relationship we highlight between development and the labor share. We then provide a model in order to explain the evolution of the labor share during the development process. The model hinges on decreasing entry costs during development, outside opportunities that depend on a low-productivity traditional sector, and frictions in the labor market. These assumptions are particularly relevant in the case of DCs and are supported by the empirical literature. Results come from the low ability of workers to generate wage competition among employers in DCs and obtain the competitive wage. In our model, frictions are due to (shadow) entry costs. In turn, such frictions together with low productivity traditional firm explain the low and decreasing labor share in developing countries. When modern sector is sufficiently developed, wage competition among employers makes wages increase more than productivity gain in the economy and the labor share increases as a result.

We leave several research issues of our paper to future work. First we use variables at the aggregate or at the sector level in our estimates. It would be interesting to explore the impact of development using micro level data on firms to study the sharing of rents directly at the firm level. Other issues left behind in the theoretical model concern the location choice of entrepreneurs (in the traditional or the modern sector), the expansion of entrepreneurship during the development process and if the growth of the modern sector come from new or existing entrepreneurs. In the model, those aspects of development are taken as exogeneous. We chose to keep the model as simple and tractable as possible and focus our attention on the consequences of dual labor markets on the sharing of value added. Nevertheless many questions remain open that we leave for future research.

5 Appendix

5.1 UNIDO Data

UNIDO Data:

Wages and salaries: All payment in cash or in kind paid to "employees", including direct wages and salaries, remuneration for time not worked, bonuses and gratuities, housing and family allowances paid directly by the employer and payment in kind. Despite UNIDO recommendation, there can remain employer's social security contributions, pensions and insurance schemes, as well as the benefits received by employees under these schemes, and severance and termination pay.

Value Added: Value of the output less value of the inputs, which covers tha value of materials and supplies for production and cost of industrial services received. Can be at factor cost (i.e. excluding indirect taxes minus the subsidies) or at market cost (including indirect taxes minus the subsidies), depending on the treatment.

Gross fixed capital formation: refers to the value of purchases and own-account construction of fixed assets during the reference year less the value of corresponding sales. The fixed assets covered are those (whether new or used) with a productive life of one year or more.

5.2 List of manufacturing sectors

Table 1: Sub Sectors

Isicccode	Sub sector
311	Food products
313	Beverage
314	Tobacco
321	Textile
322	Wearing apparel, except footwear
323	Leather products
324	Footwear, except rubber or plastic
331	Wood Products
332	Furniture, except metal
341	Paper and products
342	Printing and publishing
351	Industrial chemicals
352	Other chemicals
353	Petroleum refineries
354	Misc. petroleum and coal products
355	Rubber products
356	Plastic products
361	Pottery, china, earthenware
362	Glass and products
369	Other non-metallic mineral products
371	Iron and steel
372	Non ferrous metal
381	Fabricated metal products
382	Machinery, except electrical
383	Machinery, electric
384	Transport equipment
385	Professional and scientific equipment
390	Other manufactured products
Tot= 28	

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