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Abstract: *This paper aims to understand the pattern of the labor share of income during the development process. We highlight a U-shapped relationship between development and the labor share. Our theory emphasizes the interplay between firms'monopsony power and the size of the informal sector when the formal labor market has frictions. The size of the informal sector parameterizes workers'outside opportunities in wage setting. In the first stage of development, productivity gains are not compensated by wage increases, as most of workers'outside opportunities depend on the informal sector whose productivity remains unchanged. The labor share decreases as a result. In the second stage of development, outside opportunities rely more on productivity in formal firms as the formal sector expands. Consequently, the labor share increases. We then use a policy experiment, namely capital account liberalization episodes, in order to determine the causal impact of economic development on the labor share.*

keywords: *Development ; Informal sector ; Labor share ; Matching frictions*

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

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1 Introduction

There is a vast literature linking income inequality to economic development. In this paper, we adopt a new perspective concerning this debate by focusing on the labor share, that is the ratio of wage bill to value-added. Dualism in the organization of production activities is pervasive in developing countries (DCs), where informal, low-productivity methods of production coexist with higher-productivity, formal methods in urban areas. One the other hand, evidence suggests that productivity and wages may not be related as they are in developed countries over the medium run. The example of China is illustrative. Since the begining of the economic boom, wages evolution was far from capturing the spectacular productivity boom, which reinforce competitivity. Since a few years ago, wages increase substantially more than productivity. In 2010, wages increased by 15% in China as the result of the tightness of the labor market. We question 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 informal sector.

There are at least three reasons for focusing on development's impact on the labor share of income. First, consider the trade view. Trade with developing economies is often seen as unfair competition for industries in developed countries. 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.

Secondly, there is the inequality view. Development is often seen as a necessary condition for the well-being of individuals. But we also know since Kuznets (1955) that the first stages of development are associated with increasing inequalities between those who participate in the economic boom and those which are excluded from it. In this paper we focus on the labor share, since the factor distribution of income is a key component of income inequality. Most of the studies have focused on wage inequality. By contrast, little attention have been paid to the labor share. Still, labor share movements can modify income inequality, in particular when the capital distribution is more concentrated than the wage distribution.[1]

Finally, there is the capital flow view. Economic development originates in capital accumulation and as a result, capital account openness may be an important factor of economic development. Nevertheless, if productivity gains are captured by foreign capital owners, the population's standard of living may not change.

The main reason for the neglect of the labor share relies on Kaldor's stylized fact (1955) in favor of constant labor shares across time and space, in spite of Solow's 1958 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 (LDCs). In addition, the labor share remains substantially higher in developed countries than in DCs.

[1] Checchi and Garcia Penalosa (2009) show that the labor share is an important determinant of income inequality in OECD countries. Similarly, Garcia-Penalosa and Orgiazzi (2009) highlight the increasing role in unequal possession of capital in OECD countries. Concerning developing countries, Daudey and Garcia-Penalosa (2006) show that a larger labor share is associated with a lower Gini coefficient of personal incomes and that the effect is quantitatively large.

This article offers several contributions. First, it provides a new theoretical explanation for the decrease in labor share that LDCs experienced in the last decades. Secondly, it predicts that, over the very long run, the labor share should increase to reach a higher level than initially. Thirdly, it explains the spectacular decrease of the informal sector that DCs has experienced during development. Finally, it tests for the causal impact of development on the labor share using a novel natural experiment.

We proceed in four steps. Section 2 presents a variety of facts that (i) we plan to explain and (ii) we take as a starting point in the rest of the paper. (i) We document a Kuznets curve between the labor share and the log of GDP per capita. The labor share decreases with GDP per capita at early stages of development, while it increases with GDP per capita at later stages. Although we do not control for causality (however, see below), this finding is robust to country fixed effects, time effects, and control variables like capital intensity, trade, and institutional financial openess. (ii) We highlight three channels that could drive this relationship. First, cross-country studies show that regulation and entry barriers in goods markets decreases with development. Second, the informal sector shrinks with development. Finally, firms in the informal sector are less productive than firms in the formal sector.

Section 3 proposes a theoretical model that is based on the facts highlighted previously. The model is static and features formal and informal sectors, shadow entry costs and endogenous frictions in the formal sector, multiple applications, and capital choice. 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 informal sector productivity.

Rents in the product market are introduced in a simple way. Following Blanchard and Giavazzi (2003), we suppose that firm entry in the formal sector involves paying a shadow entry cost. Unlike resource costs, shadow costs imply rents that must be split between firm owners and their employees. Shadow costs refer to the product market regulations that limit the number of competitors at the sectoral level. Although we make this assumption for simplicity, the idea that entry costs determine product market competition is consistent with Djankov et al (2002), who show that high entry costs are generally associated with less product market competition in DCs.

The formal sector is characterized by frictions in the labor market, whereas the informal labor market is competitive. 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 (1998) for Tunisia, and Berman (1997) and Yashiv (2000) for Israel). By contrast, the informal sector seems to have far fewer frictions.[2]

Frictions together with the informal sector determine firms'ability to pays workers below marginal product and enjoy the rents obtained in the product market. We follow Albrecht, Gautier and Vroman (2006) –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

[2]Mc Kenzie and Woodruff (2006) show that (real) entry costs to open a micro-firm are very low in the Mexican informal sector. Fleck and Sorrentino (1994) show that a majority of micro-firms in the informal sector corresponds to an individual, working at home and without any loans. Yamada (1996), Marcouiller et al (1997) and Maloney (1999) show for Peru, El Salvador and Mexico that self-employed workers and workers in family business represent a large part of the informal sector that correspond to a vast unregulated sector of entrepreneurs. As noted by Zenou (2008) if frictions exist in this sector, they should not be very important as a result.

the worker receives. Individuals either receive their marginal product or get paid the monopsony wage.

As inidviduals can always work in the informal sector, informal wages provides a lower bound on indiviual wage and sizes the monopsony wage. In equilibrium, the number of firms in the formal sector depends on entry costs, capital costs, total factor productivity, and on the productivity differential between formal and informal firms.

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 and an increase in formal sector productivity / a decrease in capital cost. On the one hand, the decrease in entry costs fosters competition in the goods market. The entry of new firms increases wage competition as workers' outside opportunities strengthen, relying more on high-productive formal sector firms. As a result, the labor share increases. On the other hand, productivity increases more in the formal than in the informal sector. The rising productivity gap between the formal and informal 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. Secondly, the increase in profits induces entry of new firms, which makes the labor share increase due to greater competition for labor ressources. The negative effect dominates at early stages of development. 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.[3] At some point, the competition effect start to dominate and the labor share rises along the development path.

In Section 4, we assess the empirical validity of the model's prediction of a causal relation between development and the labor share. We use financial liberalization episodes to evaluate the causal impact of development on the labor share. Financial liberalization episodes have substantial impacts on output growth during the 3-5 years following liberalization (see Henry, 2003, 2007, and Henry and Sasson, 2009). We use these particularly uneven growth episodes that occur only for a small group of countries. We typically compare the pattern of the labor share during the period 1980-1997 between the group of countries that have liberalized and the group of countries that have not. We use the sample of Henry and Sasson (2009) that consists of 58 developing countries with stock markets and detailed information on capital account policy between 1980 and 1997. Of these 58 countries, 18 experienced a liberalization episode. We divide the sample of developing countries into two groups according to income per capita. We find that the labor share is around 3.5 points lower during the period following the liberalization date for the low income sample compared to low income economies that did not liberalize, while the labor share is 7 points higher for the higher income sample.

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 Bertolila and Saint Paul (2003), Blanchard and Giavazzi (2003), Jones (2003), and Acemoglu and Guerrieri (2008). None of these papers focuses on developing countries, however a notable exception is Gollin (2002) 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.

[3] See Harrison (2002)

Second, the paper is related to the literature on inequality along the development path. This literature starts with Kuznets (1955), who argues that inequality increases 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 (1976), Knight (1976), and Fields (1979), 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 U-shape for evolution of income inequality over time (inequality between sectors). Nevertheless, Bourguignon and Morrisson (1998) review the empirical evidence of such a U-shaped relationship and show that it is not robust. 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 informal sector plays a key role in formal sector performance is widely accepted in the literature.[4] Our framework relies on the coexistence of a frictional labor market in the formal sector and a competitive market in the informal sector in DCs. Zenou (2008) and Satchi and Temple (2009) make a similar assumption and include workforce migration in their model, following Harris and Todaro (1971). 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 (2008) follow Amaral and Quintin (2006) and adopt a different perspective. In their work, formal and informal sectors both feature frictions. Workers differ in formal sector productivity and choose whether they work in the formal sector or not. Charlot et Al (2011) also consider frictions in both sectors with large firms and focus on the impact of various regulations on the size of the informal sector. Wages are negotiated in three approaches and outside opportunities rely on the size and productivity of the informal sector. Whether the informal sector is frictional or not is not important in our paper. What is important is the fact that informal sector productivity influences the monospony wage. 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.

Finally, this article is closely related to the literature dealing with the impact of firm monopsony power on the labor share. Decreuse and Maarek (2009) show that FDI has a negative impact on the labor share because of the monopsony power that foreign firms as from their technologies advance. Daudey and Decreuse (2007) study the impact of education on workers'mobility between jobs and their ability to generate wage competition between potential employers. They show that education has a positive impact on the labor share in OECD countries. This paper is interested in the evolution of firms'monopsony power during the development process and highlights the role of the informal sector.

The rest of the paper is organized as follows. Section 2 presents the stylized facts and discusses the various assumptions we make in the theoretical model. Section 3 presents the model and examines the predicted relationship between labor share and development. Section 4 presents a policy experiment we

[4]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.

use as an exogenous shock to estimate the causal impact of development on the labor share. Section 5 concludes.

2 Stylized facts

In this section, we present several stylized facts that motivate the model. First, we show that the labor share is higher in developed countries than in DCs and it tends to decrease over time in DCs and more particularly in LDCs. Second, we emphasize the fact that regulation in the goods market decreases with development. Third, we present some evidence of a negative correlation between development and the size of the informal sector and we document the characteristics of informal sector workers.

2.1 Labor share and development

The labor share is defined as the ratio of the total wage bill to value added:

$$\text{LS} = \frac{wL}{Y} \tag{1}$$

This simple definition for the labor share does not deal with measurement difficulties that bias international comparisons. The most important issue - highlighted by Gollin (2002) - is to accurately account for the income of self-employed workers. Self-employed income is usually considered as capital income. This downward bias the measure of the labor share and makes international comparisons difficult as the proportion of self-employed in the total workforce is very different from one country to another (see Nunziata, 2008). This is particularly problematic in our case as the proportion of self-employed is much more important in DCs than in developed countries.[5].

The wage data come from the Industrial Statistics Database of the United Nations Industrial Development Organization (UNIDO). UNIDO provides data on total wages and salaries and value added for the manufacturing sector, from 1963 to 2003 (unbalanced) for more than 120 countries. For a given year, wages and salaries include all payments paid to employees.[6]

Reasons to use this dataset are twofold. First, the UNIDO database allows us to avoid the bias induced by self-employed workers described above. The dataset only covers the manufacturing sector and contains wage and value added for almost 120 countries. Firms with less than 4 employees are excluded from the survey (this threshold can differ between countries, see Ortega and Rodriguez, 2006). Therefore, self-employed workers are excluded from the data and adjustments are not necessary. Furthermore, our model focuses on the urban labor force. Thus, focusing on the manufacturing sector seems more relevant for

[5]To correct this bias, Gollin (2002) suggests to attribute a fictive wage to self-employed workers corresponding to the mean wage of employees. This adjustment is open to criticism as in the case of DC, the majority of self employed are poor workers.

[6]Payments include: (a) direct wages and salaries; (b) remuneration for time not worked; (c) bonuses and gratuities; (d) housing allowances and family allowances paid directly by the employer; and (e) payments in kind. Excluded from wages and salaries are employers' contributions on behalf of their employees to social security, pension and insurance schemes, as well as the benefits received by employees under these schemes and severance and termination pay. If social contributions were included, the gap between labor shares in developed and developing countries would even be more important and the labor share would increase much more with development.

our purpose. The second reason we use this dataset is that it provides long series for wages for some low-income economies (10-year series), which is not the case for UN data.

As a crude measure of development, we use the log of GDP per capita adjusted for purchasing power parity which is provided by the World Bank. We identify four subgroups of countries according to the World Bank classification in 2006: lower-income, lower middle-income, upper middle-income, and high-income groups.

We first run regressions on different subgroups of countries. We control for time and country fixed effects. Regressors are lagged one period to deal with endogeneity issues. Second, we estimate a regression for all DCs that include the square of the log of GDP per capita in order to identify a non-monotonic relationship between the labor share in manufacturing sector and development. Note, however, that the results presented in this subsection are simple correlations and deducing causality would require a more sophisticated econometric approach.

We now control for other variables that could introduce potential biases. First, we control for factor accumulation. Indeed, development can impact the labor share through factor accumulation depending on the elasticity of substitution between capital and labor. We add a proxy for the capital-ouput ratio. We use the investment-output ratio I/Y available from the UNIDO database. Then, we use proxies for openness. It is important to control for openness to deal with omitted variable bias as development and openness frequently go toghether. We use the trade ratio of exports plus imports to GDP $OPEN$ as a proxy for trade openness. We also use the index of Ito and Chinn (2006) $OPENK$ for financial oppeness. The regressions we run are:

$$\mathrm{LS}_{it} = a_i + a_t + \beta_1 GDP_{it-1} + \beta_2 I/Y_{it-1} + \beta_3 OPENT_{it-1} + \beta_4 OPENK_{it-1} + u_{it} \tag{2}$$

$$\mathrm{LS}_{it} = a_i + a_t + \beta_1 GDP_{it-1} + \beta_2 GDP^2{}_{it-1} + \beta_3 I/Y_{it-1} + \beta_4 OPENT_{it-1} + \beta_5 OPENK_{it-1} + u_{it} \tag{3}$$

Results are presented in Table 1.

	Low income	Low-middle	Upper-middle	High income	DCs
GDP	-15.86^{***} (3.93)	-2.15 (3.02)	23.06^{***} (4.94)	5.98^{**} (2.95)	-119.31^{***} (22.33)
GDP^2	.	.	.	.	7.59^{***} (1.41)
I/Y	3.37^{***} (0.89)	1.17 (1.10)	5.93 (6.60)	26.11^{***} (5.88)	2.12^{**} (0.83)
OPENT	-0.253^{***} (0.05)	0.018 (0.044)	-0.029 (0.040)	-0.274^{***} (0.053)	-0.043 (0.026)
OPENK	3.27^{***} (1.10)	1.94^{**} (0.89)	-0.645 (0.709)	0.042 (0.477)	1.27^{**} (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

Table 1: Labor share and development, Part I

All regressions include country and time effects. Robust standard errors between brackets.

Significance levels: *** 1%, ** 5%, * 10%

Development has a negative impact on the labor share at early stages of development. Then the labor share increases with development. The impact of development for *low-income* countries (at the begenning of development process) is strongly negative. It becomes less negative for *lower-middle* income countries. For the *upper middle-income* group the impact is strongly positive. Those correlations between the labor share and GDP per capita suggest a U-shaped à la Kuznet for the labor share. It is consistent with other studies showing a clear decrease of the labor share in DCs and more particularly in LDCs.[7]

We conclude that there exists a U-shaped curve between labor share and development, robust to the inclusion of controls such as country and time dummies, openness variables, and capital deepness.[8]. In our mind, we are the first to highlithed such a systematic U-shapped pattern.

Figure 1 represents the relation between development and the labor share. We substract to the labor share the estimated countries fixed effects, time dummies and impact of controls in order to have the partial correlation between the labor share and log GDP per capita[9].

2.2 Entry costs on the good market, development and the informal sector

In this subsection, we document the effect of entry costs on goods markets and their evolution with respect to the level of development. This analysis is based on Djankov et al (2002), who compute three different measures of entry costs for 1999.[10] Entry costs drastically diminish with development. The most

[7]See for example Harrison (2002) or Maarek and Decreuse (2009).

[8]Harrison (2002) shows that the labor share decreases a lot in developing countries over the three past decades. Luo and Zhang (2010) document a similar negative trend for china. On the other hand, many researchers report a substantially higher labor for developped than for developping countries (see Ortega and Rodriguez for instance).

[9]Formally, $LS - \beta_3 I/Y_{it-1} + \beta_4 OPENT_{it-1} + \beta_5 OPENK_{it-1} - a_i$

$-a_t = \beta_1 GDP + \beta_2 GDP^2 + \varepsilon_{it}$

[10]The dataset covers the number of procedures, official time (in business days) to comply with those procedures and official cost (as a percentage of per capita income) a start up must bear before it can legally operate. The sample used includes 85 countries.

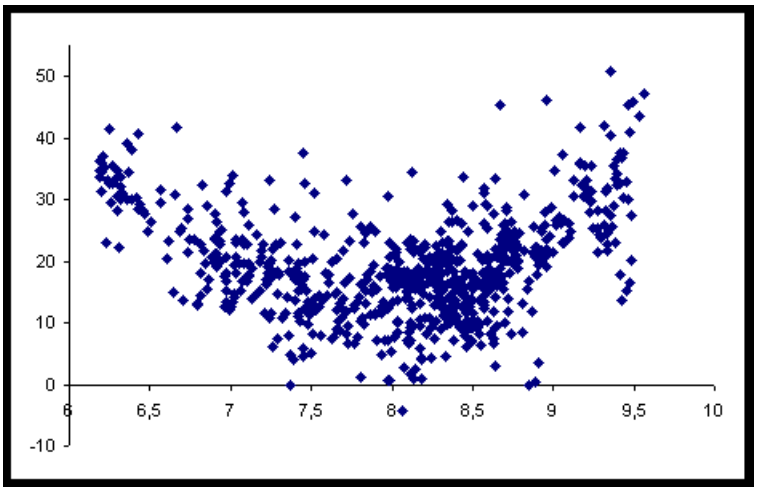

Figure 1: LS and development: A Kuznets type relation. Formally, the statistical model is the following: $LS_{it} = a_i + a_t + \beta_1 GDP_{it} + \beta_2 GDP_{it}^2 + \beta_3 X_{it} + u_{it}$ where X_{it} is a vector of control variables. The variable $LS_{it} - a_i - a_t - X_{it}$ (vertical axis is represented as a function of GDP_{it} (horizontal axis)

striking difference concerns cost as a percentage of per capita GDP. Although creating a start up is quite cheap for the first quartile of countries (10% of per capita GDP), this cost may become unbearable for many potential entrants in DCs where it can reach 400% of GDP and where credit market imperfections are often important.

On the other hand the size of the informal sector sharply decreases over the development process. Therefore, the informal sector is much more important in DC than in developed countries. It represents around 10% of GDP in most developed countries and until 60%-70% in some developing countries. Actually, Straub (2005) and La porta and Shleifer (2008) point out that GDP per capita is the main determinant of the informal sector. Nevertheless, as shown in La porta and Shleifer (2008), even controling for GDP per capita, various regulations in the formal sector affect the size of the informal sector. As we show in the theoretical model, regulations on the good market aiming at limiting firm entry decreases the labor share as it affects the ability of worker to generate competition between potential employers (outside options of labor). Table 2 shows a high correlation between entry regulation and the labor share, controlling for the level of development, several controls and country and time fixed effect (methodology is the same as previous section). We consider as a proxy for entry costs the Regulation of Labor, Credit and Business index (REG) of the Fraser Institute (Scaled from 0 - high regulations - to 10 - low regulations - See details in appendix).

	DCs	DCs	DCs	DCs	DCs
REG	1.85*** (0.533)	1.62*** (0.559)	2.30*** (0.62)	1.39* (0.794)	2.45*** 0.683
GDP		−67.72*** (19.41)	−94.80*** (21.43)	−97.50*** (22.64)	
GDP^2		4.28*** (1.21)	6.30*** (1.35)	6.48*** (1.45)	
I/Y			0.703 (0.821)	0.674 (0.872)	
OPENT			−0.037 (0.027)	−0.022 (0.028)	
OPENK				0.765 (0.485)	
dummies	yes	yes	yes	yes	yes
R^2 (within)	0.178	0.182	0.307	0.315	0.279
nb countries	74	74	57	54	54
nb observations	1065	984	623	590	590

Table 2: Labor share and development, Part II

All regressions include country and time effects. Robust standard errors between brackets. Significance levels: *** 1%, ** 5%, * 10%

Third, La porta and Shleifer (2008) using the *micro survey* of the world bank that per worker value added is 60% higher in formal firms than in informal one. La Porta and Shleifer (2008) find strong empirical support for the dual view. They show that if managers have higher human capital in the formal sector, other workers are identical in the two sectors suggesting that workers in the informal sector are mainly those who did not find any job in the formal sector due to lack of opportunities. [11] The informal sector is not only composed of small and low productive firms but also of millions of very poor self employed looking for some ways to subsist. The idea of an informal sector relatively less productive than the formal sector consisting of self-employed individuals is confirmed by Barnerjee and Dufflo (2007) who account for economic living of the poor and focus on individuals with less than one or two dollars per day. They show that those individuals are often independent entrepreneurs getting subsistence income from informal sector due to lack of better opportunities. Nevertheless, informal economy is very heterogeneous and can also be composed of some very productive individuals. We adopt this dual view in our modelization which sees the unofficial economy as an archaic sector and informal firms as providers of livelihood to millions, perhaps billions, of extremely poor people (Tokman 1992), and cautions against any policies raising the costs of the unofficial firms.

[11] In the Informal Survey, only 6.1% of the managers in the informal firms have a college degree whereas for the same countries, 63.9% of the managers in the Enterprise Survey have a college degree. For the Micro Survey those proportions are respectively 12.2% and 43.1%. Concerning the average employee, in the informal firms of the Informal Survey 48.7% only have a primary education and 44.8 for the same countries of the Enterprise Survey. For the Micro Survey those proportions are respectively 59% and 47.9%

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 model must fit several fundamental characteristics of development put forward in the former section. Namely: (i) entry costs decrease along the development path, (ii) formal sector productivity increases, (iii) the labor market is dual and the informal sector shrinks during development.

3.1 Environment

We use a static matching model with enrty costs in the goods market in the spirit of Daudey and Decreuse (2006) and Decreuse and Maarek (2009). Our model differs in two aspects. First, we introduce an informal sector specific to DCs. The formal sector is characterized by frictions in the labor market whereas informal labor market is competitive. Then, we study the implications over the long run of changes in capital costs (or more generally of an increase in formal sector productivity) and changes in entry costs.

There is a continuum of identical individuals normalized to one. There are two sectors. In the informal sector, each worker produces $z > 0$. In the formal sector, each firm is endowed with a single job slot, which can be available or not. Holding an available job slot has cost (entry cost) $\chi > 0$.[12]

From a national accounting perspective, it is important to make explicit the nature of the cost. It can receive two 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.[13] Capital costs and superprofits are part of value added and do not coincide with labor income. Entry costs cannot correspond to intermediate goods expenditures (that would be subtracted from value added) or to wage payments (that would enter the wage bill). The cost can also correspond to the lack of managers with high human capital who find it profitable to comply with different regulations in order to benefit from high-productivity formal technology. Following the dual view of the informal sector documented in the former section, high and low human capital managers do not operate in the same market. In turn, the scarcity of high human capital managers induces rents in the formal sector. Finally, to ensure that the unemployment rate does not directly depend on GDP per capita, we assume that entry costs are proportional to mean output y, that is $\chi = cy$.

Before starting producing in the formal sector, firms and workers meet according to the meeting technology $M(u, v)$ that defines the number of meets (not the number of effective matches as we will see) and depends on the number of job seekers u and the number of vacant jobs v. It is important to specify the microfoundations we use in this framework as it determines the pattern of wages. We use the model of Albrecht et al (2007) - AGV - of *equilibrium directed search with multiple applications*. The game played by workers and potential employers occurs in several steps as specified in AGV.

[12] One can also think of a single entrepreneur which can open several job slots at cost χ for each job slots. In developing countries, there exists many barriers to start a business but also to make it grow (labor regulations, taxes or administrative procedures)

[13] Blanchard and Giavazzi (2003) consider such shadow costs to ensure that pure profits are not dissipated in entry costs. The cost can correspond to regulations as documented in Djankov et al (2002)

1. Each vacancy posts a wage w.
2. Each unemployed worker observes all posted wages and submits a applications with no more than one application for each vacancy and where $a \in \{1, 2, ..., A\}$.
3. Each vacancy randomly selects one application if it receives at least one; other applications are rejected.
4. The firm offers the worker the posted wage if the worker has a single offer. If more than one vacancy makes an offer to the worker, then each vacancy can increase its bid. This leads to Bertrand competition and the worker obtains the whole surplus of the match.
5. The worker can reject any offer.
6. If the match occurs, the firm chooses the amount of capital at unit cost r.

Let $\theta = v/u$ characterize the labor market tightness. AGV show that when the labor market is large $(v, u \to \infty)$ the probability for a worker to become employed, that is the number of matches over the number of job seekers $Q(u, v, a)/u = q(\theta, a)$, converges to

$$q(\theta, a) = 1 - \left(1 - \frac{\theta}{a}(1 - e^{-a/\theta})\right)^a \tag{4}$$

where $q(\theta, a)$ is increasing and concave in θ. The probability of filling a vacancy $Q(u, v, a)/v$ is decreasing and concave in θ and $Q(u, v, a)$ is homogenous of degree one in u and v. The probability that any application leads to an offer equals the number of meets divided by the number of applications $M(u, v, a)/au = m(\theta, a)$ can be deduced:

$$m(\theta, a) = \frac{\theta}{a}(1 - e^{-a/\theta}) \tag{5}$$

The meeting technology has the same properties as the matching technology.

AGV (2006) show that in the case of *multiple applications* when $a > 1$ the equilibrium posted wage is the monopsony wage. In our case, the monopsony wage equals output that can be achieved in the informal sector. The intuition for this result is as follows. Suppose there is a common wage $\widetilde{w}$ that is larger than the monopsony wage. With multiple applications, a vacancy always has an incentive to deviate from the common wage and undercuts it. Indeed, if the vacancy undercuts the posted wage by ε, the benefit (if he recruits a worker) amounts to ε. The corresponding cost is the decrease in the probability of receiving at least one application. However, this cost is not large as the following reasoning illustrates. Workers aim at generating wage competition between potential employers. In this purpose, they need two offers. They know that a vacancy that offers a lower wage will be less demanded. Therefore, they have strong incentives to apply to such a vacancy. This mechanism implies that the probability to fill the vacancy does not decline much with the decrease in offer wage. Actually, the probability even increases when the common wage is low. It ensures that the equilibrium posted wage decreases down to the monopsony wage. We refer to AGV for a formal proof.

Without loss of generality, we assume in the remainder of the paper that each worker can apply for two vacancies, that is $a = 2$. All workers start unemployed and $u = 1$. The probability for a worker to

receive an offer for a particular application is $m(v)$, which is increasing in v. Similarly, the probability for a worker not to find any offer for a particular application is $1- m(v)$. The probability for a firm to meet a worker can be computed as follows. The total mass of workers who receive an offer is $2m(v)$. Those offers must come from the v firms. Therefore, the probability that one particular firm meets at least one worker is $2m(v)/v$. This probability is equal to $1 - e^{-2/v}$ and decreases with v.

When a vacant job becomes occupied, the firm sets the quantity of capital k at unit cost r. The production technology is $f(k)$ and is strictly increasing and concave in k. We define $\alpha(k) \equiv kf'(k)/f(k) \in (0,1)$ as the elasticity of output with respect to per capita capital.

As the labor market is large, having an offer with the first application does not affect the probability to have one with the second application. The two probabilities are independent. Hence, with probability $(1 - m(v))^2$ the worker does not find any offer and does not contribute to production. In this case, the worker works in the informal sector. With probability $2m(v)(1 - m(v))$, only one application leads to an offer. In this case, as we have shown above, the worker receives the monopsony wage z. Monopsony power appears here. If a worker does not find an alternative offer, he is unable to generate wage competition and is paid under his marginal product. Finally, search can be successful for two applications with probability $m(v)^2$. The two firms enter Bertrand competition to attract labor services and offer the whole surplus, which is the competitive wage. Indeed, a firm unable to attract any worker cannot produce but has already paid the entry cost.[14]

Satchi and Temple (2009) and Zenou (2008) also make the assumption that a worker who does not find any offer in the (frictional) formal sector works in the (competitive) informal sector. As specified and justified in the introduction, the implicit assumption is that the labor market in the informal sector is perfect and hence worker can automatically find a job in this sector. Nevertheless if there are frictions in this sector, z can correspond to gain expectations. This would not alter the results.

In our model, frictions in the formal sector parameterize the size of the informal sector. Satchi and Temple (2009) calibrate a matching model à la Mortensen and Pissarides (2000) 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 entry costs to explain the important size of the informal sector.

3.2 Equilibrium

Solving the model mainly consists of determining the number of firms in the formal sector. We start by writing the profit maximization problem of the representative firm:

$$\pi = \max_k \left\{ -\chi + \frac{2m(v)}{v} \left[(1 - m(v)) (f(k) - rk - z) \right] \right\} \tag{6}$$

With probability $m(v)/v$ the firm meets a worker and makes a wage offer. With probability $1 - m(v)$ this is the only offer that the worker receives and he is paid the monopsony wage that is z. With

[14] Maloney (1998, 1999, 2002), Gong and van Soest (2002) or Gong et al (2004) estimate for Mexico that there exist many moves of workers from formal to informal sector and vice-versa. The two worlds are not completely separate.

probability $m(v)$ the worker receives another offer from another firm and he receives the whole match surplus $f(k) - rk$.

It is important to note that the higher v, the lower the expected profit. On the one hand, the probability for a firm to meet a worker decreases with v. On the other hand, the probability $m(v)$ for a worker to find an alternative offer increases with v.

As χ is exogenous and as k does not depend on v, we can rewrite the maximisation problem as follows:

$$\pi = -\chi + \frac{2m\left(v\right)}{v}\left(1 - m\left(v\right)\right)\max_{k}\left(f(k) - rk - z\right) \tag{7}$$

The first order condition implies $f'(k) = r$: the marginal product of capital equals its marginal cost.

We have seen that an increase in v leads to a decrease in expected profit through two different channels. If firms could freely enter the market, the expected profit π for a new entrant would be nil. As there are opportunities to make profit, new firms enter the market, increasing v. As the number of job seekers is constant, the expected profit decreases for each firm. At equilibrium, $\pi = 0$ and the free-entry condition implicitly defines the number of firms

$$c = \frac{2m\left(v^*\right)}{v^*}\left(1 - m\left(v^*\right)\right)\left[1 - \alpha(k^*) - \frac{z}{f(k^*)}\right] \tag{8}$$

We assume for the rest of paper that $z < \left(1 - \alpha\left(k^*\right)\right) f\left(k^*\right)$. That is, outside opportunities in the informal sector are lower than the competitive wage. This assumption is in line with the empirical evidence reported in section 2 thereby formal firms are more productive than informal firms. Equation (8) determines the number of firms as a function of entry cost c, outside opportunities in the informal sector z, capital cost r and parameters of the production technology such as total factor productivity.

3.3 The labor share

We determine the total wage bill, total output and the labor share.

In a first step, we compute total output. The worker has two different probabilities to meet a firm. Workers receive two offers with probability $m(v)^2$ or only one application is successful with probability $2(1 - m(v))m(v)$. The sum of those probabilities corresponds to the total probability for a worker to match with a firm. When a worker matches with a firm, he produces $f(k)$ that depends on the quantity of capital firms rent. Hence, total output is defined as

$$Y = \left[2m\left(v\right)\left(1 - m\left(v\right)\right) + m(v)^2\right] f(k) \tag{9}$$

We now compute the wage bill. There are two possible wages for worker. Either he is paid z if he receives a single offer, or he is paid the competitive wage if he receives two offers. Hence total wage bill is

$$W = 2m\left(v\right)\left(1 - m\left(v\right)\right)z + m(v)^2(1 - \alpha(k))f(k) \tag{10}$$

Finally, the labor share LS is

$$\text{LS} = \frac{W}{Y} = \frac{2m\left(v\right)\left(1 - m\left(v\right)\right)z + m(v)^2(1 - \alpha(k))f(k)}{\left[2m\left(v\right)\left(1 - m\left(v\right)\right) + m(v)^2\right] f(k)} \tag{11}$$

After simplification, we get

$$\text{LS} = (1-\alpha(k))\frac{m(v)}{2-m(v)} + \frac{2(1-m(v))}{2-m(v)}\frac{z}{f(k)} \tag{LS}$$

As we assume that $z < (1-\alpha(k^*))f(k^*)$ the labor share is lower than in the competitive case where $LS = 1-\alpha(k)$. Firms derive monopsony power from the lack of opportunities in the formal sector (lack of potential employers and hence low probability of finding two offers) and from the low productivity of informal sector that determines workers' outside opportunities.

We now study the links between development and the labor share and highlight the crucial role played by the informal sector.

3.4 Labor share and development

The development process is captured through the evolution of three parameters: a decrease in the entry cost c, a decrease in capital cost r, and an increase in total factor productivity A. We show that a decrease in c translates into a positive effect on the labor share whereas a decrease in r (or an increase in A) has ambiguous effects.

As we saw in the previous subsection, a decrease in entry cost implies an increase in the ratio of vacancies over the number of job seekers. To see the global effect on the labor share, we differentiate the expression for LS with respect to c:

$$\frac{d\text{LS}}{dc} = \frac{2m'(v^*)}{(2-m(v^*))^2}\left(1-\alpha(k^*)-\frac{z}{f(k^*)}\right)\frac{dv^*}{dc} < 0 \tag{12}$$

Thus, a decrease in entry cost translates into an increase in the labor share. The mechanism hinges on wage competition between firms. The probability of having two offers increases with the number of firms, making wages increase at constant output. As a result the labor share goes up. Therefore, unemployment (informal sector share of employment) decreases, GDP per capita increases and the labor share goes up. This first source of development induces an increasing relation between labor share and development.

Now, we turn to a decrease in capital cost, or, equivalently, to an increase in TFP. The decrease in capital cost may be related to financial openness (see below), or to more basic development mechanisms presented in Section 2. The impact on the labor share is:

$$\begin{aligned}\frac{d\text{LS}}{dr} &= -\alpha'(k^*)\frac{m(v^*)}{2-m(v^*)}\frac{dk^*}{dr} \\ &\quad + \frac{2m'(v^*)}{(2-m(v^*))^2}\left(1-\alpha(k^*)-\frac{z}{f(k^*)}\right)\frac{dv^*}{dr} \\ &\quad - \frac{2(1-m(v))}{(2-m(v^*))}\frac{z}{f(k^*)^2}f'(k^*)\frac{dk^*}{dr}\end{aligned} \tag{13}$$

The decrease in capital cost has three effects. The first is well-known and also occurs under perfect competition. An increase in capital intensity leads to an increase in the labor share through changes in competitive factor prices only if the elasticity of substitution between capital and labor is lower than one. Duffy and Papagiorgiou (2000) conclude that this elasticity is slightly lower than one in DC (only for

the *lower-income* group), and slightly higher than one for *high-income* countries. Hence, this first effect should have a low magnitude, in accordance with the estimates reported in subsection 2.1.

The second effect is induced by the impact of capital cost on the equilibrium number of firms. Differentiation of equation (8) - that describes the number of firms - yield the following

$$\begin{aligned} & -\left[(1-\eta)\frac{1-m}{v}+\eta\frac{m}{v}\right]\left(1-\alpha-\frac{z}{f}\right)dv^* \\ = \quad & (1-m)\,\alpha\left(1-\alpha-\frac{z}{f}+\frac{kf''}{f'}\right)\frac{1}{kf''}dr \end{aligned} \tag{14}$$

where $\eta = m'(v)\,v/m(v)$. This impact is ambiguous through the term $1-\alpha-\frac{z}{f}+\frac{kf''}{f'}$. An increase in k can lead to an increase in entry cost per unit of match surplus $f(k)-rk$ as the entry cost is proportional to GDP per capita. However, when the technology is Cobb-Douglas, this ambiguity disappears and $dv^*/dr<0$.

The third effect is due to the asymmetry between formal and informal firms. An increase in capital intensity translates into an increase in the gap between workers' outside opportunities in the informal sector and their productivity in the formal sector. The labor share decreases according to this third effect.

The first two effects induce a positive correlation between development and the labor share but the third induces a negative correlation. The magnitude of this effect is likely to be high in the first stage of the development process. To see this, consider a Cobb-Douglas technology. Suppose that capital cost varies from $r_{\max}$ to a steady-state value where $r_{\max}$ corresponds to the level for which productivity in the formal sector equalizes productivity in the informal sector. Parameter $r_{\max}$ is defined as follows:

$$r_{\max} = \alpha A\left(\frac{z}{(1-\alpha)\,A}\right)^{\frac{\alpha-1}{\alpha}} \tag{15}$$

When r tends to $r_{\max}$, LS tends to $1-\alpha$. Therefore, a decrease in r first translates into a decrease in the labor share.

We now briefly consider the case of TFP growth. Let $f(k)=Ag(k)$ where A stands for TFP. We can decompose the variation of the labor share following an increase in TFP as before:

$$\begin{aligned} \frac{d\mathrm{LS}}{dA} \quad = \quad & -\alpha'(k^*)\frac{m(v^*)}{2-m(v^*)}\frac{dk^*}{dA} \\ & +\frac{2m'(v^*)}{(2-m(v^*))^2}\left(1-\alpha(k^*)-\frac{z}{f(k^*)}\right)\frac{dv^*}{dA} \\ & -\frac{2(1-m(v))}{(2-m(v^*))}\frac{z}{f(k^*)^2}\frac{df(k)}{dA}\left[\frac{df(k)}{dA}+f'(k)\frac{dk^*}{dA}\right] \end{aligned}$$

The effects are very similar to the ones exposed in the case of the capital cost. As before, the third effect dominates at early stages of development, which implies that the labor share tends to decrease when TFP increases.

The predicted decline in labor share with development is consistent with the stylized facts highlighted in Section 2. The labor share sharply decreases over time since the mid 1980s in poor countries (*lower-income* and *lower middle-income* countries). This could be due to the third effect, potentially very

important at the first stage of development. Furthermore, as noted by Blanchard and Giavazzi (2003), the number of firms only adjusts over the long run following a decrease in entry costs. This makes the second effect of wage competition - making labor share increases - very weak over the short and medium run. The labor share could decrease a lot in periods of high productivity gains as the number of firms does not adjust instantaneously. Moreover, strong capital market imperfections in DCs (high asymmetry of information, bad institutions making controls difficult) can make this adjustment longer. At longer horizon, the decrease in entry cost and rising TFP in the formal sector make labor share increases. Therefore, we can explain that developed countries have higher labor shares: lower entry costs and high productivity increases the number of firms and makes monopsony power and rents decrease. Outside opportunities of workers rely less on the informal sector as the probability of finding two offers in the formal sector increases.

We have seen that if the sharp decrease in entry cost observed over development unambiguously raises the labor share, this is not the case for a productivity increase that induces two con‡icting effects on the labor share. We perform a simple comparative static exercise in order to determine which of the two effects of a productivity increase dominates at early stages of development for realistic values of parametters: the negative one, induced by an increase in productivity gap or the positive one, induced by an increase in competition on the labor market. We use the meeting technology of AGV (2006), and $m(v,2) = (v/2)\left(1-e^{-2/v}\right)$. We calibrate the different parameters having a low-income economy in mind. The number of vacant positions in order to generate an informal sector corresponding to 40% is given by $UNR = [1-m(v)]^2 = 40\%$. It gives $v = 0.80$. The technology is Cobb Douglas with an elasticity of output with respect to per capita capital $\alpha = 0.4$. The proportion $1-\alpha$ is also the competitive labor share. It is an upper bound for the labor share in our model. The gap between earnings in the informal sector and productivity in the formal sector is 40%. Using equation (LS), those assumptions imply that the labor share is 44%. Finally, equation (10) allow us to compute the entry cost $c = 11\%$. This cost is consistent with the level of institutional entry cost presented in Section 2. Table 2.4 shows that the mean entry cost among countries belonging to the fourth quartile of income per capita is about 110% of GDP per capita. This value cannot be directly used in our static framework. Firms spread fixed costs over their lifecyle. La porta and Shleifer (2008) report that the average age of firms is about ten years in the Micro Survey and the Informal Survey. It follows that the actual value of entry cost in our fralework should be $c = 1.08/10 = 11\%$ as a result.

We consider a one percentage point increase in productivity without changing z and, compute our two conflicting effects highlighted in the previous section. It appears that the negative effect is ten times larger than the postive one. Hence, an increase in productivity of formal firms with constant productivity in the formal sector has a very negative impact on the labor share of income. This finding is consistent with the negative effect of development on the labor share in the early stages of development.

In the basic model we make the implicit assumption that a worker who does not find any offer in the formal sector works in the informal sector. The unemployment rate (or the proportion of workers working in the informal sector) is $UNR = [1-m(v)]^2$ and corresponds to the probability that a worker does not receive any offer for both applications. Hence, as the number of firms increases with the development of the formal sector, the weight of the informal sector declines. When c and r decrease or A increases, the

unemployment rate decreases. This corresponds to the dual view of informal sector: the development of the formal sector makes the informal economy disappears, not the reverse. This theory highlights the role of policies such as human capital or regulatory policies (both decreasing c) that promote the creation of formal firms. In our model, the informal sector does not penalize formal firms, but sustains the development of the formal sector by limiting wage increases as productivity rises.

4 Empirical investigation

To assess the empirical content of our theory, we proceed in two steps. We use periods of financial liberalization as a natural experiment to test the effect of an (exogenous) development shock on the labor share. Financial liberalization considerably lowers the labor share in lower income economies, while the labor share increases in developed countries.

4.1 Empirical evidence

Our theory predicts a clear causal impact of development on the labor share. The correlation presented in previous sections are difficult to interpret in causal terms. The decrease in the labor share could help credit constrained firms to finance investment. At later stages of development, the increase in the labor share and the subsequent decrease in inequalities may favor mass comsumption of goods produced using increasing returns to scale technologies, as suggested by some *big push* theories.

We directly test the effect of financial liberalization and subsequent output growth on the labor share of income for a subset of developing countries. We follow the methodology of Henry and Sansson (2009) who discuss the effects of financial liberalization on wage growth and adapt it to the case of the labor share. The key idea is to use financial liberalization episodes as natural experiments to evaluate the causal effect of develompent on the labor share.

Many DCs experienced unprecedented increases in national income as a result of capital account openness. Many channels through which financial openness affects output growth exist in the literature. In the standard growth model, capital account liberalization works through its impact on capital accumulation as DCs are initially labor abundant. On the other hand, liberalization increases the quantity of capital goods that developing countries import from industrial nations (Alfaro and Hammel, 2007). If technology diffuses from developed to developing countries through the technology embodied in capital goods imports à la Eaton and Kortum (1999, 2001), then liberalizations may indeed drive up the growth rate of total factor productivity. In the late 1980s DCs all over the world began easing restrictions on capital inflows of all kinds, giving researchers a series of before and after experiments with which to study the impact of factor flows on productivity and factor reward. Henry (2003), Bekaert et al (2005) and Henry and Sasson (2009) show that capital account liberalization leads to an important increase in productivity and wage growth in the whole economy and in the manufacturing sector for a subset of DCs. Henry and Sasson show that during a three to five-year window following capital account liberalization, productivity growth in the manufacturing sector is 8 points higher each year than in non- liberalization periods. They show that capital account liberalization props up investment during this period[15] and as

[15]Henry (2000 a, b), Kim et Singal (2000) et Martell et Slutz (2003) also show that stock prices increase by a lot during

predicted by the Solow model, the growth rate temporally increases until the economy moves to the new steady state.[16]

We use the same sample of DCs as Henry and Sasson (2009). Capital account liberalization is a policy decision that should be exogenous with respect to the labor share. It provides a natural experiment as we can compare the pattern of the labor share before and after liberalization. Then, financial liberalization in DCs offers an interesting and unique experience in the sense that we can observe in a very short period an economic development whose magnitude would have involved a much longer period if liberalization had not taken place. This is very welcome as our series on the labor share for developing countries generally consists of 10-15 years starting from the beginning of the 1980s.

As explained in Henry (2003, 2007) and Henry and Sasson (2009), defining a good proxy for capital account liberalization is not obvious. Capital account liberalization has many components and standard measures[17] of financial openness do not tell us more about which specific component has been liberalized. For example the IMF's indicator does not indicate whether the liberalization episode from an easing of restrictions on capital inflows or outflows. A change in any composite index does not indicate which of the specific components have been liberalized. To increase the statistical power of any regression, it is important to focus on a policy experiment where the true variation in the data of interest (capital inflow liberalization) is large relative to noise.[18] As argued by Bekaert et al (2005) or Henry and Sasson (2009), stock market liberalization provides just such an experiment (see Frankel, 1994).

We use the same strategy as Henry and Sasson (2009).[19] They use the date a country first opens its stock market to foreign investors from the Standard and Poor's Emerging Markets database. This database contains 58 DCs with stock markets. Of these 58 countries, 18 experienced a liberalization date between 1980 and 1997, and none of them before 1980. We construct a binary variable that takes value 1 for all years after the liberalization date and 0 for all years preceding the liberalization date. As most liberalization dates concentrate at the end of the 1980's and at the beginning of the 1990's, we have for each liberalized countries, two roughly equal periods of 8 years (depending on exact liberalization date and data availability). Nevertheless, this concentration of liberalization dates in a short window is problematic. Despite the fact this date is a simple policy decision, its exogeneity may be questioned. To deal with this issue, we construct a control group with countries that have not experienced liberalization episodes. The empirical exercise consists of comparing the labor share periods before and after openness and to control with the pattern of the labor share of countries that have similar characteristics but that have not (or not yet) experienced such a liberalization episode. This is to make sure that movements in the labor share are not driven by an X factor (affecting both the probability of financial liberalization

the period following financial openness. See also Bekaert et al (2005), Henry (2003) or Bekaert et Harvey (2000) for further evidence.

[16]Henry (2007) argues that the absence of correlation between growth and capital account openness in the literature is mainly due to the bad concordance between theory and empirical works. The theory predicts temporary higher growth rate (and permanent gains) but most of the researchers test for permanent higher growth rates by regressing capital account openness index on mean growth rates.

[17]For example the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER).

[18]As argued by Henry (2007), most of papers that find no effect of liberalization on real variables tell us nothing about the validity of theory because they do not really test it.

[19]See appendix for the list of countries available in the Henry and Sasson sample and the liberalization dates.

and the labor share such as GDP level) that has affected all countries that are quite similar.

We divide the sample into two groups. One group consists of country/year observations with a per capita GDP measured in power purchasing parity less than 3000$. This corresponds to the estimated threshold reported in Section 2 above which development starts to have a positive impact on the labor share. Other countries/year observations are in the second group. Hence we can compare countries at a similar stage of development with similar characteristics. As in Henry and Sasson (2009), the estimation strategy consists of a panel data model with country fixed effect to take into account the fact that countries may have very different labor shares and that it could be correlated with our dummy variable of liberalization. We also control for time dummies in order to compare the evolution of the labor share in liberalized countries to an evolution of the labor share common to the control group of countries (countries that did not liberalize at date t). Formally, we estimate the following equation:

$$LS_{it} = \alpha_i + \alpha_t + \beta^* LIBERALIZE_{it} + \varepsilon_{it}$$

The expected sign of the estimated coefficient β is negative for the subgroup of lower income countries and positive for the higher income subgroup of developing countries. Our subsample of liberalized countries for low income countries consists of only five countries whereas the whole sample of low income countries consists of 27 countries.[20] For this subgroup of countries, results have to be interpreted with caution even if they seem to be very significant. Hence, the subsample of higher income group consists of 13 countries that have experienced a liberalization date for a total of 34 countries. Standard errors are robust to an arbitrary form of heteroskedasticity. Regressions are run for the period 1980-1997 (corresponding to the standard and poor's emerging markets database).

	Lower income	Higher income
$LIBERALIZE$	-3.67^{***} (1.33)	7.31^{***} (1.27)
within R^2	0.17	0.22
Dummies	yes	yes
No obs	276	447
No countries	27	34

Table 6: Effect of capital account liberalization on the labor share

All regressions include country and time effects. Robust standard errors between brackets.

Significance levels: *** 1%, ** 5%, * 10%

The impact of stock market liberalization (as a proxy for easing capital inflows restrictions) appears to be very significant and economically very important. The labor share measured over the years following a liberalization episode is almost 3 points lower relative to pre-liberalization period for lower income economies. Liberalization episodes give us an idea of the consequences of long-run economic development (but observed over a short period) on the labor share for developing economies. We can see that the

[20]Low income countries that have liberalized during the period are India, Indonesia, Nigeria, Pakistan and Zimbabwe. We could add Egypt and Sri Lanka but liberalization dates are not consistent and cannot be verified (see Henry and Sasson, 2009). Results remain the same if we include those countries.

magnitude of the response to liberalization dates is asymmetric. As shown by Bekaert et al (2005), the growth effect of such a policy is much higher for countries with good legal institutions or relatively efficient financial markets. It's not surprising that for higher income economies, the stock market liberalization has a higher impact on post-liberalization growth rates and, as a result, on the evolution of the labor share. One may wonder whether the labor share decreases (by decreasing minimum wage for example) before liberalization occurs in order to attract capital flows. A simple regression shows this is not the case. As expected, for higher-income developing economies, the impact of accelerated economic development has a positive impact on the labor share.

5 Conclusion

We provide a model 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-productity informal sector, and frictions in the (formal) 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 high entry costs and the low productivity of the informal sector. In turn, such frictions explain the low and decreasing labor share in developing countries. We also explain other phenomena linked to development such as the progressive decline of the informal sector.

The theoretical model implies a causal relation relation between development and the labor share in the sense that an increase in productivity causes labor share movements. We directly test for causality using a policy experiment generating uneven growth during a short time period. Using a diff in diff estimator, we show that this growth leads to a decrease in the labor share in lower income economies and an increase in the labor share in higher income economies, in line with our theoretical model. We leave several research issues of our paper to future work. First we use aggregate level variables 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 shadow or in the formal economy), the expansion of entrepreneuship during the development process and if the growth of the formal 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. Neverthless many questions remain open that we leave for future research.

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APPENDIX

List of countries, UNIDO data

- Low income: Bangladesh, Benin, Bhutan, Burkina-Faso, Burundi, Central African Republic, Chad, Cote d'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, India, Kenya, Madagascar, Malawi, Mongolia, Mozambique, Nepal, Niger, Nigeria, Pakistan, Papua New Guinea, Rwanda, Senegal, Sierra Leone, Somalia, Sudan, Togo, Uganda, United Republic of Tanzania, Viet nam, Yemen, Zambia, Zimbabwe
- Lower middle income: Albania, Algeria, Bolivia, Bosnia & Herzegovina, Brazil, Bulgaria, Cameroon, China, Colombia, Congo, Cuba, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Guatemala, Honduras, Indonesia, Iran, (Islamic Republic of), Iraq, Jamaica, Jordan, Lesotho, Morocco, Namibia, Nicaragua, Paraguay, Peru, Philippines, Republic of Moldova, Samoa, Serbia and Montenegro, Sri Lanka, Suriname, Swaziland, Syrian Arab Republic, TFYR of Macedonia, Thailand, Tonga, Tunisia
- Higher middle income: Argentina, Barbados, Belize, Botswana, Chile, Costa Rica, Croatia, Gabon, Hungary, Latvia, Libyan Arab Jamahiriya, Malaysia, Mauritius, Mexico, Oman, Panama, Poland, Romania, Russian Federation, Saint Lucia, Seychelles, Slovakia, South Africa, Trinidad and Tobago, Turkey, Uruguay, Venezuela, China (Hong Kong SAR), China (Macao SAR), Korea, Republic of, Singapore
- Higher income: Australia, Austria, Bahamas, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Luxembourg, Malta, Netherlands, Netherlands Antilles, New Zealand, Norway, Portugal, Puerto Rico, Qatar, Saudi Arabia, Slovenia, Spain, Sweden, United Arab Emirates, United Kingdom, United States of America

List of countries, Standard and Poor's Emerging Markets dataset

- Lower income economies (GDP per capita $<$ 3000\$ in 1988): Bangladesh, Benin, Burkina-Faso, Cameroon, Central African Republic, Chad, Congo, Cote d'Ivoire, Gambia, Ghana, Honduras, India, Indonesia, Kenya, Madagascar, Malawi, Nepal, Niger, Nigeria, Pakistan, Rwanda, Senegal, Sierra Leone, Syrian Arab Republic, Togo, Zambia, Zimbabwe
- Higher income economies (GDP per capita $>$ 3000\$ in 1988): Algeria, Argentina, Barbados, Brazil, Chile, China (Taiwan Province), Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Fiji, Gabon, Guatemala, Iran, (Islamic Republic of), Jamaica, Jordan, Korea, Republic of, Malaysia, Mauritius, Mexico, Nicaragua, Oman, Paraguay, Peru, Philippines, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela
- Countries that liberalized between 1980 and 1997: Argentina, Brazil, Chile, Colombia, India, Indonesia, Jordan, Malaysia, Mexico, New Zealand, Nigeria, Pakistan, Philippines, South Africa, Thailand, Turkey, Venezuela, Zimbabwe.

Variables, sources

- GDP: Log of GDP per capita measured in purshased power parity.

Source: World bank. World Development Indicators 2005

- I/Y = Ratio of Investment to value-added in the manufacturing sector

Source: UNIDO industrial statistics database INDSTAT3 2005 ISIC Rev.2
Values lower than 0 have been omitted from the sample

- LS: Labor share = Ratio of wages and salaries to value added (x100)

Source: UNIDO industrial statistics database INDSTAT3 2005 ISIC Rev.2

- OPENK: Chinn and Ito financial openness index. Composite index varying between 2.62 (very open) and -1.75 (close). It is based on four dummy variables reflecting the four major categories on the restrictions on external accounts: presence of multiple exchange rates, restrictions on current account transactions, restrictions on capital account transactions, requirement of the surrender of export proceed.

Source: Chinn and Ito (2007)
Data available at http://www.ssc.wisc.edu/~mchinn/kaopen_2006.xls

- OPENT = Ratio of total exports and imports to GDP

Source: World bank. World Development Indicators 2005

- REG: Regulation of Credit, Labor and Business. The index ranges from 0-10 where 0 corresponds to 'high regulations'and 10 corresponds to low regulations.

Source: Fraser Institute
Descriptive statistics of variables

variable		Mean	Stand dev	Min	Max	Obs
LS	Overall	32.44	12.26	2.23	85.33	$N = 1930$
	Between		10.00			$n = 103$
	Within		7.54			$T = 18.73$
GDP (log)	Overall	7.92	0.82	6.11	9.83	$N = 3185$
	Between		0.80			$n = 129$
	Within		0.21			$T = 24.68$
I/Y	Overall	0.35	2.35	-0.17	81.86	$N = 1230$
	Between		0.92			$n = 82$
	Within		2.23			$T = 15$
OPENK	Overall	-0.39	1.29	-1.75	2.62	$T = 3728$
	Between		1.14			$n = 143$
	Within		0.80			$T = 26.06$
OPENT	Overall	68.51	38.60	1.53	283.40	$N = 4485$
	Between		33.94			$n = 144$
	Within		18.81			$T = 31.14$
REG	Overall	5.22	1.05	2.47	7.40	$N = 2292$
	Between		0.87			$n = 88$
	Within		0.55			$T = 26.04$