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Which factor bears the cost of currency crises?

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Which factor bears the cost of currency crises? ^{*†}

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Abstract: This paper identifies which of the two factors, namely labour and capital, bears the cost of currency crises and for what reasons. It analyzes two main types of effects that currency crises may have on the labour share: across sector effects and within sector effects. We build a descriptive model with a tradable sector and a non-tradable one which can differ in their capital intensities so that structural changes occurring during currency crises may change the aggregate level of the labour share. The model also highlights that crises erode the bargaining power of workers so that *within* sectors, crises lower the labour share. We perform estimations on manufacturing sectoral panel data for 20 countries which have experienced currency crises. We conclude that currency crises lower the aggregate manufacturing labour share by 2 points on average and that this decline reflects mostly changes within sectors.

keywords: Currency crisis ; Labour share ; Factor reallocation ; Matching frictions

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The consequences of financial crises on macroeconomic variables such as output, investment or unemployment are relatively well understood by economists (see, for instance, Reinhart and Rogoff [44], Hutchison and Noy [28] or Gupta et al. [25]). Recently, empirical analyses have also started to address the question of whether crises have an impact on distributional variables. Crises have been found to increase poverty and to make the personal distribution of income more unequal (see Baldacci et al. [5] and Galbraith and Lu [23]). Surprisingly, the question of how financial crises impact the *factor* distribution of income has received little attention. The effect on the capital and labour shares is particularly important given that crises lead to output losses, and hence examining changes in factor shares helps us to understand which of the two factors bears the cost of the crisis, and for what reasons. The notable exception is Diwan [18] and Diwan [19] who finds that the aggregate labour share falls sharply after a financial crisis.

In our mind the reason for these changes is twofold. As argued by Rodrik [45], the current wave of globalisation makes capital more mobile and the high mobility of capital during crisis could reduce the bargaining power of workers and the aggregate labour share of income. However, there is an alternative hypothesis. The exchange rate depreciation that characterizes a crisis tends to induce reallocations across sectors which can differ in their labour share. If sectoral labour shares differ, this reallocation will result in changes in the aggregate labour share even if sectoral ones remain constant. That is, changes in the aggregate labour share may be simply due to changes in the weight of different sectors in aggregate output.

This paper presents a two-sector model which highlights these two different effects and uses sectoral panel data to discriminate between them. Over the last decade there has been a revival of interest in the evolution and the determinants of the labour share, largely driven by the fact that in the last decades of the 20th century it declined sharply in a number of countries, as documented, for example, by Blanchard [8], Poterba [42], and Harrison [27].¹ The distributional effects can be important since, because capital income is more concentrated than labour income, reductions in the labour share result in higher personal income inequality; see Daudey García-Peñalosa [17] and Checchi and García-Peñalosa [13], [14]. The consequences can be even more dramatic in developing countries where capital is largely held by foreigners.

Several possible determinants of the labour share have been examined by the literature: product and labour market deregulations, capital-biased technological change, union bargaining power or labour adjustment cost, see Blanchard and Giavazzi [9], Blanchard [8], Acemoglu [1] and Bentolila and Saint Paul [7]. A question that has received substantial attention has been the impact of openness on factor shares, since the decline in labour shares has, to a large extent, coincided with a period of increasing trade in goods and assets. Ortega and Rodriguez [40], Harrison [27] and Jayadev [29] all conclude on a negative relationship between globalization and the labour share. Following Rodrik [45], [47], this literature maintains that globalization has eroded the bargaining power of labour since the current wave of globalization is characterized by a greater mobility of capital relatively to labour, which increases the

¹Note, however, that this variable was of major interest for classical economists. Kaldor [31] argued that the evidence indicated that factor shares were constant over time, although some of his contemporaries were suspicious about this presupposed constancy; see Solow [48] and Kravis [36].

outside options of the former and hence its bargaining power.

Diwan [18], [19] has examined the pattern of the labour share during currency crises using aggregate UN data and defining a currency crisis as a depreciation of the nominal exchange rate of at least 25%. His results indicate that the labour share falls sharply after a financial crisis and recovers partially some time latter.

To examine the channels through which currency crisis is likely to impact the labour share of income, we construct a static model in the spirit of Dutt et al [21] who study the impact of trade on unemployment. The model features two autonomous sectors which differ in their capital intensity and their tradability. The product market is characterized by entry costs and the labour market by matching frictions which imply that firms make super profits and workers are not paid their marginal products. The model highlights two reallocation effects driven respectively by the exchange rate depreciation and by the reduction in capital stock that characterize currency crisis. The exchange rate depreciation increases the share of the tradable sector and decreases (increases) the aggregate labour share if the tradable sector is capital (labour) intensive. The impact of a decrease in the aggregate capital stock on the share of the capital intensive sector depends on the elasticity of substitution between the two goods. Hence, depending on whether the tradable sector is capital or labour intensive and on whether the elasticity of substitution between the two goods is higher or lower than one, the two reallocation effects may move in opposite directions. The second type of effect echoes Rodrik's type argument and describes the effect of crisis within sectors. During a crisis the outside options of labour which are 'local' shrink, whereas the one of capital which are global remain constant. The resulting loss of labour bargaining power leads to a decrease in the labour share within sectors.

We next turn to the data to examine the relationship between currency crises and the labour share using manufacturing sectoral panel data. Our empirical analysis has two goals. The first one is to see whether the negative correlation between crises and the labour share still holds when we use more suitable data than Diwan, notably when we consider the labour share in manufacturing and adopt a different currency crisis criterion. To do that, we compute the manufacturing labour share from UNIDO sectoral data which is more relevant to correctly measure labour income in developing countries and which is also available for many developing countries at the 3 digit level. We use the panel dataset of Kaminsky [33] to identify currency crises. Currency crises are defined according to the index of Kaminsky and Reinhart [32] which is more appropriate. Indeed, the depreciation of the nominal exchange rate used by Diwan can simply reflect high inflation episodes. The index we use is a weighted average of the rate of change of the real exchange rate and of reserves, with weights such that the two components of the index have equal sample volatilities.² Our second aim is to understand to what extent changes in the overall labour share in manufacturing are due to within sector effects (bargaining effect) or to across sector effects (composition effect).

We find that currency crises are associated with a reduction in the aggregate manufacturing labour

²Formally the index is : $I = \frac{\Delta e}{\sigma_e} - \frac{\sigma_e}{\sigma_R} \frac{\Delta R}{R}$. where σ_e is the standard deviation of the exchange rate and σ_R the one of reserves. σ_e/σ_R stands for the weights of the average and allows the index I to be such that its two components have equal volatilities. When the index takes a value greater than three standard deviation above the mean (on monthly data), the observation is considered as a crisis observation. To deal with high inflation countries, Kaminsky and Reinhart [32] divide their sample into two groups, the high inflation one (inflation rate higher than 150 percent in the six previous month) and low inflation one and apply the criteria on each group.

share and that this decrease reflects a decrease within manufacturing sectors, which suggests a fall in the bargaining power of workers in this context of currency market turbulence. This conclusion is in line with the theories pointing out that openness hurt labour, see Rodrik [45] or Jayadev [29]. We also show that this decrease hides large disparities across the different types of crises since our results indicate that some of them actually lead to an increase in the labour share.

The rest of the paper is organized as follows. Section 2 presents the theoretical model which allows us to examine the different channels through which currency crises can impact the labour share. Section 3 undertakes the empirical analysis of the link between currency crises and the labour share. Section 4 concludes.

I THE MODEL

In this section, we present a model highlighting the different channels through which currency crises may have an impact on the aggregate labour share. The aim of this section is not to explain why a currency crisis occurs but rather to describe its potential effects on the labour share. Hence we take the crisis as an exogenous variable. Our model is static and mainly based on Dutt et al. [21], who study the impact of trade on unemployment according to various theories.

I.1 THE MACROECONOMIC BACKGROUND OF THE CRISIS

In this subsection we present some stylized facts coming mainly from Kaminsky and Reinhart [32] and Kaminsky [33] concerning what happens to some macroeconomic aggregates during a currency crisis. The main features of the theoretical model presented below are compatible with these facts.

A currency crisis is characterized by a major and sudden exchange rate depreciation. Kaminsky and Reinhart show that during the 18 months before the crisis occurs, the real exchange rate is overvalued by 20% relative to its trend. Just after the currency crisis occurs, the real exchange rate is 10% undervalued relative to its trend and remains stable during the 18 months following the crisis. As a result exports underperform prior to the currency crisis and sharply increase after the crisis, suggesting major factor reallocations from non tradable sectors to tradable ones, see Tornell and Westermann [49] or Kehoe and Ruhl [34] for evidence.

Moreover, crisis episodes are generally associated with a decrease in the capital stock. Indeed, several indicators in Kaminsky and Reinhart [32] suggest a decrease in the funds available to finance firms' investments: the acceleration of the loss of deposits, the decrease in the annual growth rate of domestic credit/GDP ratio, the losses of foreign exchange reserves and the decrease in stock prices. Therefore there is evidence that financial crises are associated with massive capital flights.

Hutchison and Noy [28], using panel data over the 1975-1997 period for 24 emerging-market economies, show that currency crises reduce output by about 5 to 8 percent over a two to four year period. Reinhart and Calvo [43] identify the credit channel and the resulting impact on aggregate demand attributable to the sudden stop in capital inflows combined with an external financing premium. For Mendoza [39] the sudden stop in capital inflows hurts the financial sector and, given collateral constraints, leads to credit

crunch which induces debt-deflation and a contraction in activity. Furthermore the macroeconomic environment during crisis, characterized by firm bankruptcies, makes banks more cautious (Calvo [11]), making them reduce their loans which contribute to recession. As a result, investment and capital stock drop during a currency crisis.

Another fact we want to highlight on is the pattern of unemployment and employment during crisis periods. As noted by Fallon and Lucas [22] in a survey devoted to the impact of financial crisis on the labour market outcome, unemployment rises quite sharply in the year of the crisis in six of the seven cases studied in their paper. Fallon and Lucas [22] also report an increase in self employment during crisis.

We now turn to the basic model which incorporates those aspects: nominal and real exchange rate depreciation, capital scarcity, output losses, and rise in unemployment rate.

I.2 THE BASIC MODEL

I.2.1 ENVIRONMENT

We propose a static model designed to analyse the impact of currency crisis on the labour share. As in Dutt and al [21], the model features two sectors with different factors intensities one of them being tradable which allows us to highlight factor reallocations during a crisis. The model also exhibits matching frictions on the labour market and rents on the good one. Wages are bargained over the surplus as in standard Pissarides framework. This allows studying the relative bargaining power during a crisis and the resulting impact on the labour share within sectors. We first present and solve the model, then we turn to currency crises.

There is a final non-tradable good Z , produced under perfect competition using two intermediate inputs: X which is tradable and Y which is not. The production function is CES with an elasticity of substitution $\sigma \in [0, \infty)$:

$$Z = (\gamma X^{\frac{\sigma-1}{\sigma}} + (1-\gamma)Y^{\frac{\sigma-1}{\sigma}})^{\frac{\sigma}{\sigma-1}}. \quad (1)$$

The good Z is the numeraire and its price is normalized to one. We obtain the following cost function:

$$1 = (\gamma^\sigma p_x^{1-\sigma} + (1-\gamma)^\sigma p_y^{1-\sigma})^{\frac{1}{1-\sigma}}, \quad (2)$$

where p_x stands for the price of X and p_y for the price of Y .

We can write the relative demand function for the two goods as $X/Y = ((1-\gamma)/\gamma)^{-\sigma} p^{-\sigma}$. We make the simplifying assumption that there is a foreign demand component so that we can write the total relative demand for the country i in a more general formulation as:

$$\left(\frac{X}{Y}\right)^d = f(e) \left(\frac{1-\gamma}{\gamma}\right)^{-\sigma} p^{-\sigma} \text{ with } f_e > 0, \quad (3)$$

where $p = p_x/p_y$ is the relative price of good x and e is the exchange rate. An exchange rate depreciation

increases the relative demand of good X while the elasticity of substitution between the two goods remains constant.

The two intermediate goods are produced using two factors, labour and capital, with a Cobb-Douglas technology. Per worker production functions are $x = A_x k_x^{\phi_x}$ and $y = A_y k_y^{\phi_y}$, where ϕ_x and ϕ_y stand for constant output-capital elasticities, and k_x and k_y for capital per worker ratios. Total production in each sector is $X = A_x(1 - u_x)L_x k_x^{\phi_x}$ and $Y = A_y(1 - u_y)L_y k_y^{\phi_y}$ where u_s stands for unemployment rate in sector $s = x, y$, A_s for total factor productivity, and L_s corresponds to the number of workers who seek for a job in sector s and $(1 - u_s)L_s$ corresponds to total employment in sector s .

Labour is allocated across the two sectors:

$$L_x + L_y = L, \quad (4)$$

and the market clearing condition for capital is:

$$(1 - u_x)L_x k_x + (1 - u_y)L_y k_y = K, \quad (5)$$

where K is the total stock of capital in the economy and is assumed to be fully employed. Factor endowments are exogenous, but the allocation across sectors is endogenous. Capital is allocated across sectors so as to equalize the marginal product of capital to the interest rate:

$$p_s A_s \phi_s k_s^{\phi_s - 1} = r. \quad (6)$$

Hence the relative supply of good X is:

$$\frac{X^s}{Y^s} = \frac{A_x(1 - u_x)L_x k_x^{\phi_x}}{A_y(1 - u_y)L_y k_y^{\phi_y}}. \quad (7)$$

We now turn to the labour market. Each firm is endowed with a single job slot and can search for a worker after paying the entry cost χ . 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 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. From this perspective, this cost is a shadow cost induced by product market regulation (see Blanchard and Giavazzi [9]). Capital costs and superprofits are part of value added and do not coincide with labour income. By contrast, entry costs cannot correspond to spending in intermediary goods (that would be subtracted from value added) or to wage payments (that would enter the wage bill). This implies that the cost does not have to be deduced from output to compute value added as a monetary cost would. As a result firms make 'superprofits', and changes in wage to productivity ratios translate into labour share changes.³

We denote the number of vacancies in each sector by $v_s L_s$ and the number of unemployed by $u_s L_s$.

³We could also take a standard search cost but we would have to assume that the sharing of value added for this activity is the same as the rest of economy.

We define $\theta_s = v_s/u_s$ as the sector-specific tightness and we assume a segmented search place: each worker can search in one sector. The number of matches is a linear homogeneous function of $u_s L_s$ and $v_s L_s$, and we assume for simplicity a Cobb-Douglas matching function:

$$M_s(v_s L_s, u_s L_s) = m v_s^\gamma u_s^{1-\gamma} L_s = m \theta_s^\gamma u_s L_s, \quad (8)$$

where m is a scale parameter of the matching technology. The exit rate from unemployment is $M_s/(u_s L_s) = m_s \theta_s^\gamma$ and the rate at which vacancies are filled is $M_s/(v_s L_s) = m_s \theta_s^{\gamma-1}$.

A firm's expected profits are:

$$\pi_s = -\chi + m \theta_s^{\gamma-1} J_s, \quad (9)$$

where $J_s = p_s A_s k_s^{\phi_s} - r k_s - w_s - d$ is the value of a filled job denominated in local currency. d stands for the extra-cost of loans contracted before depreciation. Hence, $d = 0$ during peaceful periods. Free entry conditions imply $\pi_x = \pi_y = 0$ and the value of an occupied job becomes :

$$J_s = \frac{\chi}{m_s \theta_s^{\gamma-1}}. \quad (10)$$

Wages are bargained according to the Nash solution

$$w_s = \arg \max_w (J_s - I)^\beta (w_s - B)^{(1-\beta)}, \quad (11)$$

where B corresponds to workers' outside opportunities whereas I stands for the outside opportunities of capital owners. We assume that outside options for workers depend on local considerations that is, to the mean wage \bar{w} . Hence, we set $B = b\bar{w}$ in the economy. As capital can relocate easily at the world level, outside options of capital owners should depend on external factors such as productivity and profits in alternative location choice. During peaceful periods, we assume that world outside options for capital increase with local ones and is not sector specific. That is, I outside option for capital is proportional to the local mean productivity in sectors, net of capital costs, such that $I = i(1/2) \sum_s (1 - \phi_s) p_s A_s k_s^{\phi_s}$. This assumption ensures that wages increase proportionally with productivity during peaceful periods and that the labour share is stable over the long run as we are going to see below. When we will turn to the impact of currency crisis, we will relax this assumption to allow for within sector changes in the labour share of income.

The solution of the maximisation problem is $w_s - B = \frac{\beta}{1-\beta} (J_s - I)$ and by replacing we can obtain the solution for wage

$$w_s = (1 - \beta)B + \beta [p_s A_s k_s^{\phi_s} - r k_s - d - I]. \quad (12)$$

Using the equilibrium value of an occupied job (10) we can have the solution for tightness

$$w_s = B + \frac{\beta}{1 - \beta} \left[\frac{\chi}{m_s \theta_s^{\gamma-1}} - I \right]. \quad (13)$$

We can define the utility of a job seeker as $U_s = (1 - m\theta_s^\gamma)B + m\theta_s^\gamma w_s$. Using the Nash solution and (10), we can write the utility of a job seeker as $U_s = B + m\theta_s^\gamma[(\beta/(1 - \beta))(\chi/m\theta_s^{\gamma-1} - I)]$. Workers must be indifferent between the two sectors, which implies $U_x = U_y$. We can deduce $\theta_x = \theta_y$, $u_x = u_y$, $w_x = w_y = \bar{w}$, and $(1 - \phi_x)p_x A_x k_x^{\phi_x} = (1 - \phi_y)p_y A_y k_y^{\phi_y} = (1/2) \sum_s (1 - \phi_s)p_s A_s k_s^{\phi_s}$. As the unemployment rate does not vary across sectors, the marginal product of labour is equal in the two sectors.

From (6), (10) and (12) we can find a solution for sectoral capital intensities as a function of relative prices

$$k_x^* = \left(\frac{\phi_y}{\phi_x}\right)^{\frac{\phi_y}{\phi_x - \phi_y}} \left(\frac{1 - \phi_x}{1 - \phi_y}\right)^{\frac{\phi_y - 1}{\phi_x - \phi_y}} \left(\frac{A_x p_x}{A_y p_y}\right)^{\frac{1}{\phi_y - \phi_x}}, \quad (14)$$

$$k_y^* = \left(\frac{\phi_y}{\phi_x}\right)^{\frac{\phi_x}{\phi_x - \phi_y}} \left(\frac{1 - \phi_x}{1 - \phi_y}\right)^{\frac{\phi_x - 1}{\phi_x - \phi_y}} \left(\frac{A_x p_x}{A_y p_y}\right)^{\frac{1}{\phi_y - \phi_x}}. \quad (15)$$

For example, assume (without any implication for the rest of the paper) that sector X is capital intensive, that is $k_x > k_y$. Then an increase in p lowers the capital intensity in both sectors. Intuitively, an increase in p reallocates labour from sector Y to sector X . As sector X is capital intensive, the capital demand from sector X is too high with respect to the quantities available in sector Y . Hence, capital intensities have to adjust to clear the market. Furthermore from (2) an increase in p_x implies a decrease in p_y and from (6) an increase in r . This is the standard Rybczynski theorem. It is also possible to show that the relative supply curve (7) increases in p .

Recall that we have seen in the previous subsection that currency crises increase the unemployment rate. The presence of matching frictions in the model aims at replicating this stylized fact. We can derive the impact of crises on the unemployment rate from equations (12) and (13). A decrease in sectoral productivity or an increase in d following a currency crisis have a positive impact on the unemployment rate if χ remains constant.

I.2.2 THE LABOUR SHARE

The labour share is the total wage bill over value added. Entry costs must not be deduced from output due to our assumption that χ is a shadow cost. The labour share in sector s is:

$$LS_s = \frac{\beta/(1 - (1 - \beta)b) [(1 - \phi_s)p_s A_s k_s^{\phi_s} - d - I]}{p_s A_s k_s^{\phi_s}}. \quad (16)$$

During peaceful periods, due to our assumptions $d = 0$, that is there are no extra fees for debt repayment due to depreciation, and $I = i(1 - \phi_s)p_s A_s k_s^{\phi_s}$ the labour share at sector level becomes $LS_s = [\beta/(1 - (1 - \beta)b)] [(1 - \phi_s)(1 - i)]$ and it remains constant with an increase in sector s productivity.

The aggregate labour share corresponds to the labour shares at sector level weighted by each sectors'

output shares. For $d = 0$:

$$LS = [\pi((1 - \phi_x)(1 - i)) + (1 - \pi)((1 - \phi_y)(1 - i))], [\beta/(1 - (1 - \beta)b)], \quad (17)$$

where π stands for output share of sector X . As the unemployment rate is the same in both sectors,

$$\pi = \frac{L_x p_x A_x k_x^{\phi_x}}{L_x p_x A_x k_x^{\phi_x} + L_y p_y A_y k_y^{\phi_y}} = \frac{1}{1 + \frac{L_y (1 - \phi_x)}{L_x (1 - \phi_y)}}. \quad (18)$$

The aggregate labour share depends on sector-specific technologies weighted by the share of each sector in the total labour force. It also depends on the bargaining power β of workers, on the replacement rate b and on outside opportunities of capital owners i ⁴

We now turn to the impact of currency crises on the labour share.

I.3 CURRENCY CRISES AND THE LABOUR SHARE

We distinguish between two kinds of effects. First, financial crises are generally followed by a reallocation of factors across sectors due to capital outflows and the exchange rate depreciation. We show that if sectors have different capital intensities, factor reallocation implies that the labour share changes. We then turn to the impacts of currency crises on wage setting, and examine the impact on the labour shares within sectors. Parameters I and d play a crucial role in the model to study the relative bargaining strengths during crisis.

We proceed in two steps. We first present a version of the model in which the sectoral labour share is constant in order to highlight the impact of factor reallocations on the aggregate labour share. Then we allow for movements in the labour share within sectors by relaxing the assumption that capital's outside options are proportional to the aggregate productivity net of capital cost.

I.3.1 REALLOCATION EFFECTS

To derive the market clearing condition for capital, use the fact that $u_x = u_y$ to set:

$$\varepsilon k_x + (1 - \varepsilon)k_y = \frac{K}{L(1 - u)}, \quad (19)$$

where $\varepsilon = L_x/L$.

To study the impact of an exchange rate depreciation, note from (3) and (7) that a depreciation makes the relative demand of the tradable good X increase, which induces an increase in the relative price p .

⁴This parameter could be interpreted as the capital degree of mobility.

Proposition 1. *The increase in the relative price of good X makes the share π of sector X increase. If sector X is capital intensive, this implies a decrease in the aggregate labour share. If sector X is labour intensive, the aggregate labour share increases.*

Proof. If $\phi_x > \phi_y$, from (14) and (15), an increase in p lowers capital intensities in both sectors. We know that unemployment in each sector is not affected by productivity. Hence the right hand side of (19) is unaffected. At constant ε the left hand side of (19) decreases. Since $\phi_x > \phi_y$, as $k_x > k_y$ and there is no possibility for factor intensity reversal in the Cobb-Douglas case, ε must increase for (19) to hold. Negative impact on the labour share comes from the fact that $\partial LS/\partial e = (\partial \varepsilon/\partial e)(\partial \pi/\partial \varepsilon)(\partial LS/\partial \pi) < 0$. The proof is similar in the case of $\phi_x < \phi_y$. \square

We now turn to the impact of a sudden stop in capital inflows. Firms are no longer able to finance their investment and the aggregate capital stock decreases. Such capital outflows can raise or decrease the aggregate labour share depending on the elasticity of substitution σ between the intermediates.

Proposition 2. *The decrease in total capital stock in the economy lowers the labour share if the elasticity of substitution between the intermediates σ is less than one and increases the aggregate labour share if the elasticity of substitution is more than unity.*

Proof. See appendix. \square

Intuition for this result is the following. Assume x is the capital-intensive sector and that K increases. If the share of labour and capital allocated in this sector remains constant, sector x grows faster than the labour-intensive sector y . The relative price of intermediates given in (3) implies that when $\sigma < 1$ the relative price of x decreases more than proportionately. As a result, the relative value of the capital-intensive sector x falls more than proportionately. This induces a greater fraction of capital and labour allocated to the labour-intensive sector making the share π of the capital-intensive sector x decrease in total output according to (18). From (17), the labour share must increase. In this approach, as explained in Acemoglu and Guerrieri [2], the aggregate elasticity of substitution between labour and capital is determined by the elasticity of substitution between the intermediates. Assuming $\sigma < 1$ is reasonable in view of the literature.⁵

Therefore, the overall effect of the crisis due to factor reallocation is ambiguous. We have shown that if $\phi_x > \phi_y$, i.e. the tradable sector is capital intensive, the two reallocation effects work in the same direction if $\sigma < 1$ and both reallocation effects tend to decrease the labour share. If $\phi_x < \phi_y$, that is if the tradable sector is labour intensive, the two reallocation effects go in opposite directions if $\sigma < 1$.

⁵See Hammermesh [26] for a survey or Krussel et al [37], Antras [3], and Duffy and Papagiorgiou [20] for recent evidence.

We now turn to the impact of currency crises inside each sector through the bargaining channel.

I.3.2 INTRA-SECTORAL VARIATIONS IN THE LABOUR SHARE

There are various mechanisms that could link within-sector labour share movements with currency crises. Our arguments hinge on the fact that the outside opportunities of capital owners are global whereas those of labour are only local. During crises, local business opportunities shrink and so do outside options of workers. By contrast, capital can be invested abroad. Then, it pressures wages down and the labour share tends to decrease.

In the previous subsection, we assumed that world outside options for capital owners were proportional to local productivity so that the within labour shares were constant. This is not the case during an important macroeconomic shock such as a currency crisis that hurts just one country or a small number of countries. During such a period, outside options of capital owners remain constant contrary to labour. Massive capital outflows lead to a decrease in both sectors productivity (per capita output). Currency crisis could also affect productivity through TFP. We can see that if I is constant, $\partial LS_s / \partial p_s A_s k_s^{\phi_s} > 0$.

Other kinds of arguments related to bargaining strength during crisis could also explain the decrease in the labour share during a currency crisis. For instance, many crises follow a credit boom as noted by Chang and Velasco [12] or Kaminsky and Reinhart [32]. During those periods of financial excess, loan contracts between firms (or governments) and lenders are often made in dollars (see Jeanne [30]). Hence, the exchange rate depreciation increases repayment charges, which decreases the surplus over which wages are bargained, and makes decrease the labour share: $\partial LS_s / \partial d < 0$. Those effects disappear as soon as loans are repaid and as new loans are contracted at the new exchange rate level.

Those arguments, all in favour of a decrease in the labour share within each sector during a currency crisis are summarized in the following proposition.

Proposition 3. *During a currency crisis, the labour share should decrease in each sector due to (i) the sharp decrease in productivity associated to constant \bar{I} outside options of capital owners and (ii) the increase in repayment charges labelled in foreign currencies d .*

Proof. (ii) is derived from the fact that $\partial LS_s / \partial d < 0$ and $\partial LS_s / \partial b > 0$. Proof of (i) is derived as follows.

Assume that sector x is capital intensive. We can show that a decrease in capital stock shift the relative offer curve of good x to the left and that the relative price p increases. From (14) and (15) this implies a decrease in k_x and k_y . From (2) this implies a decrease in p_y . From $(1 - \phi_x)p_x A_x k_x^{\phi_x} = (1 - \phi_y)p_y A_y k_y^{\phi_y}$ the productivity $p_s A_s k_s^{\phi_s}$ decreases in both sectors as the right-hand side unambiguously decreases. The decrease in the labour share within sector comes from the fact that $\partial LS_s / \partial p_s A_s k_s^{\phi_s} < 0$. \square

To summarise our findings, we have shown that the factor reallocations across sectors have ambiguous effects on the aggregate labour share depending both on the sectoral capital intensities and on the elasticity of substitution between goods. However, currency crisis has an unambiguous negative impact within sectors.

II EMPIRICAL ANALYSIS

We have shown that currency crises can affect the labour share in two different ways. On the one hand a currency crisis can affect the structure of the economy through factor reallocations across sectors which differ in their labour shares. On the other hand, a currency crisis can affect the labour share within each sector. Moreover, different effects have opposite signs, and the overall impact is ambiguous. This raises two central questions. First, do crises increase or reduce the overall labour share? Second, to what extent is the aggregate impact due to within sector effects?

II.1 EMPIRICAL STRATEGY

Our empirical analysis consists in estimating a reduced form equation on panel data. The dependent variable is the labour share and our regressor of interest is a currency crisis dummy. In a first step we will estimate this relation in levels on aggregate manufacturing data. Our basic equation is :

$$\begin{aligned}
 LS_{it} = & a + a_i + a_t \\
 & + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} + \beta_4 Crisis_{it-3} \\
 & + \sum_k \gamma_k X_{k,i,t} + \varepsilon_{it}
 \end{aligned} \tag{20}$$

where a_i and a_t are respectively country fixed effects and time dummies and X_k are various control variables.⁶ The crisis dummy is included both in the current year and with 3 lags in order to estimate the timing of the impact of the crises on the labour share.⁷

We control for heterogeneity over time and across countries using fixed effects. In our case, controlling for unobserved heterogeneity across countries is important since developing countries are more prone to financial crises and since the labour share tends to be lower than in developed ones (see Ortega and Rodriguez [41]).

Our second step is to turn to sectoral data in order to control for unobserved heterogeneity across sectors. The estimated model is the following :

⁶We control for factors accumulation and trade and financial openness

⁷The 4-period lagged dummy is actually non significant.

$$\begin{aligned}
LS_{its} = & a + a_i + a_t + a_s \\
& + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} + \beta_4 Crisis_{it-3} \\
& + \sum_k \gamma_k X_{k,i,t,(s)} + \varepsilon_{its}
\end{aligned} \tag{21}$$

where a_s is a sectoral dummy which allows us to control for unobserved heterogeneity across sectors. 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.

In order to distinguish between intra sectoral variations of the labour share and structural effects we perform estimations in differences. First of all we estimate an equation in differences at the aggregate level, then we will turn to sectoral data in order to understand what is the share of the variation at the aggregate level explained by within sector variations of the labour share.

More precisely, we first estimate an equation in first-order differences⁸(except for the crisis dummy which we do not differentiate) to compare all the results which will follow in this section with this benchmark estimation. We regress the variations of the aggregate labour share ΔLS_{it} on financial crisis dummies at t , $t-1$ and $t-2$. Defining $\Delta LS_{it} \equiv LS_{i,t} - LS_{i,t-1}$ the variation of the aggregate labour share, the estimated model is the following:

$$\begin{aligned}
\Delta LS_{it} = & a_t + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} \\
& + \sum_k \gamma_k \Delta_k X_{k,i,t} + \varepsilon_{it}.
\end{aligned} \tag{22}$$

Second we perform a decomposition of the aggregate variation into a "within" term which captures the variations of the labour share within sectors, and a "between" term which captures the extent to which the variation in the aggregate labour share is due to changes in the structure of the manufacturing sector. Recall that the labour share is the sum of the sectoral labour 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 variation of the labour share as follows:

$$\Delta LS_{it} = \underbrace{\sum_{s=1}^n (LS_{i,t,s} - LS_{i,t-1,s}) \phi_{i,t-1,s}}_{\text{within effect}} + \underbrace{\sum_{s=1}^n (\phi_{i,t,s} - \phi_{i,t-1,s}) LS_{i,t,s}}_{\text{composition effect}} \tag{23}$$

⁸The 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 labour share within each sector, weighted by the initial sector share. This corresponds to the "real variation" of the labour share which can be due to changes in factor intensity or institutional determinants, like the bargaining power of workers. 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 labour share. This term captures the fact that a change in the aggregate labour share can be due to a change in the composition of output. The decomposition allows us to assess the importance of the two effects.

We run the regressions :

$$\begin{aligned} Within &\equiv \sum_{s=1}^n (LS_{i,s,t} - LS_{i,s,t-1}) \phi_{i,s,t-1} \\ &= a_t + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} + \sum_k \gamma_k \Delta_k X_{k,i,t} + \varepsilon_{it}, \end{aligned} \quad (24)$$

$$\begin{aligned} Between &\equiv \sum_{s=1}^n (\phi_{i,s,t} - \phi_{i,s,t-1}) LS_{i,s,t} \\ &= a_t + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} + \sum_k \gamma_k \Delta_k X_{k,i,t} + \varepsilon_{it}, \end{aligned} \quad (25)$$

to understand whether changes in the aggregate labour share estimated in equation (22) reflect intra sectoral changes of the labour share or composition effects. Performing these two estimations is the most obvious way to appraise these two effects of financial crises since we regress the two terms of the decomposition of the changes in the labour share.

Next, to perform regressions on sectoral data, we regress not the weighted sum of the changes in the sectoral labour shares but simply these variations of the sectoral labour shares ΔLS_{its} weighted by sectoral shares $\phi_{i,t-1,s}$:

$$\begin{aligned} \Delta LS_{i,t,s} * \phi_{i,t-1,s} &= a_t + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} \\ &\quad + \sum_k \gamma_k \Delta_k X_{k,i,t,(s)} + \varepsilon_{its}. \end{aligned} \quad (26)$$

This estimation should also allow us to appraise the effects of financial crises on the labour share within sectors.

In the same manner, to capture the composition effects of the financial crisis in another way than regressing the between term, we simply regress the variation of the sector shares, weighted by the labour shares:

$$\begin{aligned}\Delta\phi_{i,t,s} * LS_{i,t,s} = & a_t + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} \\ & + \sum_k \gamma_k \Delta_k X_{k,i,t,(s)} + \varepsilon_{its}.\end{aligned}\tag{27}$$

Lastly, in order to estimate differently the intra sectoral impact of financial crises on the labour share, we estimate the changes in the sectoral labour shares, weighting all of the observations by the sector shares at $t - 1$. These weighted regressions should capture a within effect of the financial crises on the labour share and allow us to perform a robustness check of our results about the within impact of the crises:

$$\begin{aligned}\Delta LS_{its} = & a_t + \beta_1 Crisis_{it} + \beta_2 Crisis_{it-1} + \beta_3 Crisis_{it-2} \\ & + \sum_k \gamma_k \Delta_k X_{k,i,t,(s)} + \varepsilon_{its}.\end{aligned}\tag{28}$$

II.2 DATA

We compute the labour 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.⁹ The UNIDO data mainly come from industrial surveys which are sent by UNIDO to the country statistical offices. The labour share is defined as the ratio of wages and salaries over value added.¹⁰ As argued by Gollin [24] this definition implies that all the income of the self-employed is treated as capital income which underestimates the labour share. This is particularly problematic in our study because it could bias the impact of financial crises. Indeed, during financial turbulence, many workers go back to the agricultural sector and/or become self-employed (see Fallon and Lucas [22]). Hence, this could lead us to misinterpret a negative relationship between financial crises and the labour share. The 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. 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. 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 labour share for self-employment income. However, there would have been major drawbacks. First, self-employment income is available for very

⁹The 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.

¹⁰See Appendix for a more precise definition of these variables.

few developing countries. Second, the availability is restricted to very few years, which does not allow for time comparisons. 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 labour 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.

The drawback is that we can examine the effects of crises only on the manufacturing labour share and not on the labour share for the whole economy. As a result, part of the reallocation effects mentioned above may not appear in the data since the manufacturing sector is usually considered as tradable. Nevertheless, structural changes induced by currency crises should exist even in such data. First, the reallocation effect between capital and labour intensive sectors is potentially important because there is some heterogeneity in the labour share level across manufacturing sub-sectors, as we show in the next section.¹¹ Moreover, even in the manufacturing sector, many goods are not traded, as shown by Kehoe and Ruhl [35]. Finally, there is heterogeneity in terms of openness across manufacturing sub sectors as shown in figure 2(a). Hence reallocations within the manufacturing sector can occur.

A problem of the UNIDO data that we have been faced with is that the way in which the manufacturing sector is desagregated 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 or decomposition of the labour share for the country-year in which this happens, since an observed sectoral variation of the labour share over time could simply reflect the merge of two sectors. We also ignore observations where the weighted sum of sectoral labour shares does not equal the aggregate one and where the sector shares does not sum up to one, which is rare.¹²

Data on currency crises come from Kaminsky [33]. The data comprises a panel dataset of 20 countries, 6 developed and 14 developing,¹³ which have experienced various currency crises in the sense of Kaminsky and Reinhart [32] and Kaminsky [33], over the 3 past decades. As we discussed previously, we have chosen the currency crisis definition of Kaminsky and Reinhart [32] because their criterion includes reserve variations, and is applied separately to high inflation and low inflation countries. Hence their criterion avoids misinterpreting an exchange rate depreciation as a financial crisis episode, which is what could have occurred with economies which have experienced high inflation. In the sample of Kaminsky [33], 96 crises are identified. The 20 countries which form part of the sample have been selected by Kaminsky [33] because they present characteristics which can allow her to apply the financial crisis criterion of Kaminsky and Reinhart [32]. More precisely, to form part of the sample countries must be small open economies, with a fixed exchange rate, crawling peg or band through portions of the sample. We have kept only the sample of Kaminsky [33] to define the database we work on.

¹¹Using the KLEMS dataset, and computing the labour share corrected for self-employment in 28 OECD countries between 1970 and 2005, we find that the labour share is on average of 68.82 for the whole economy, and of 68.22 for a specific set of sectors which comprises the sectors of manufacturing, mining and agriculture. Therefore, the labour share heterogeneity between the sectors usually considered as tradable and the rest of the economy is not high enough to think that reallocation effects could impact the aggregate level of the labour share enough that we would have no option but using data on the whole economy.

¹²We have also dropped the 34 observations where the labour shares were negative or greater than 100%.

¹³We 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. The 6 developed countries are: Denmark, Finland, Israel, Norway, Spain, Sweden. The 14 developing countries are: Argentina, Bolivia, Brazil, Chile, Colombia, Indonesia, Malaysia, Mexico, Peru, Philippines, Thailand, Turkey, Uruguay, Venezuela.

Since some observations are missing in the UNIDO database for some years, we do not observe the same number of crises in our dataset as in the sample of Kaminsky [33],¹⁴ and have only 82 crises episodes. More precisely, 28 crises episodes are observed in the 6 developed countries we dispose of and 54 in the 14 developing ones.

We include a number of control variables suggested by the previous literature. We control for capital accumulation since it is the only determinant of the labour share when factors are paid their marginal product. Moreover it allows us to test for the capital-accumulation channel of financial crises in the case of non-Cobb-Douglas function. 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 the quality of labour as there is empirical evidence of a positive link between education and the labour share, at least for OECD countries, see Daudey and Decreuse [16]. We use as a proxy of human capital the average number of years of formal schooling of adults over age 15 (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 labour share, see Rodrik [45], Harrison [27], Jayadev [29] and Ortega and Rodriguez [40]. Moreover, Kaminsky and Reinhart [32] find that many of the crises occur a couple of years after financial liberalization. Therefore, omitting openness variables would create endogeneity problems. 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 dispose of two indexes, one de jure and one de facto. The first one captures how policies are restrictive toward capital flows ; the second one measures how much capital actually flows over borders. Our de jure financial openness is the continuous composite index of Chinn and Ito [15] available from 1960 to 2006 for more than 200 countries. Our de facto financial index is the sum of total external assets and liabilities as a share of GDP which have been estimated by Lane and Milesi-Ferretti [38] in their "EWNII" dataset.

Lastly, our theoretical analysis suggests that the labour market institutions are an important determinant of the labour share, and there is evidence for OECD countries that this is indeed the case (see Checchi and García-Peñalosa [13], [14]). Unfortunately we have not been able to include a measure of institutional context due to the lack of data for developing countries.

Descriptive statistics (aggregate)	Obs	Mean	Stand dev	Min	Max
LS	580	32.90	15.60	5.21	71.40
IY	472	0.18	0.22	-0.05	3.13
School	666	5.94	2.29	2.02	11.86
OPENK (de jure)	580	0.22	1.40	-1.75	2.62
OPENK (de facto)	580	0.91	0.54	0.09	4.51
OPENT	643	50.80	28.50	7.98	228.87

Table 1: Descriptive Statistics

¹⁴For instance, the UNIDO data set does not cover 1986 for Brazil which prevents us from including this country/year in our dataset.

Table 3 summarizes the data used in regressions: LS corresponds to the labour share, IY to our variable for capital acumulation (see appendix for details), School to our variable for human capital accumulation, OPENK (de jure) to our de jure measure of financial openness, OPENK (de facto) to our de facto measure of financial openness and OPENT to trade openness. The mean labour share is 32.90%. This could seem very low. However, our data cover the manufacturing sector where the labour share is usually lower than in the rest of the economy. In addition, the wage bill does not include social contributions in the UNIDO dataset. Finally, the labour share is low in developing countries as Daudey and García Peñalosa [17] and Ortega and Rodriguez [41] show.

II.3 A FIRST GLANCE AT THE DATA

To get a first glimpse at the impact of financial crises on the labour share, we compute various variations over time of the aggregate labour share during crises episodes for each country/year. Let t be the date at which the crisis occurs. Between t and $t + 1$, the labour share falls by 1.9 percentage points. The decline is larger when we consider the period t to $t + 2$, with the labour share falling by 2.8 points. It then recovers so that the decline three years after the crisis is of 2.4 points.

The largest variation takes place between $t - 1$ and $t + 2$ and is of 2.9 points so we will focus on this time period in the following descriptive statistics.

We can observe that about 72% of the country-year crises are marked by a decrease in the aggregate labour share.

The question which arises is whether these changes reflect variations within sectors, or whether they are the results of sectoral composition effects. This question is relevant in our econometric study because manufacturing sectors are heterogenous in terms of their labour share. Figure 1 plots the sectoral fixed effects γ_s obtained by the regression $LS_{i,t,s} = \gamma_i + \gamma_t + \gamma_s$, where γ_i and γ_t are country and year fixed effects. The figure 1 shows that the labour share varies across sectors.¹⁵ It is particularly large in sector 324 (footwear) and almost 20 points below average in sector 353 (petroleum).

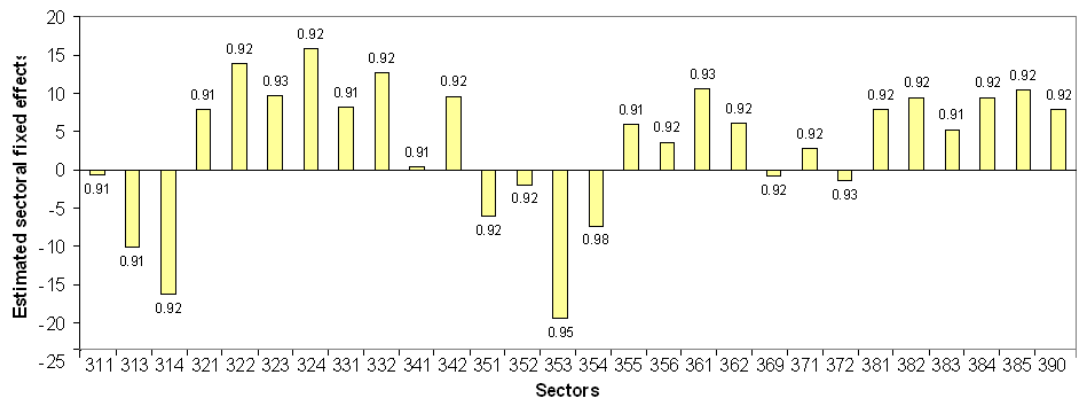
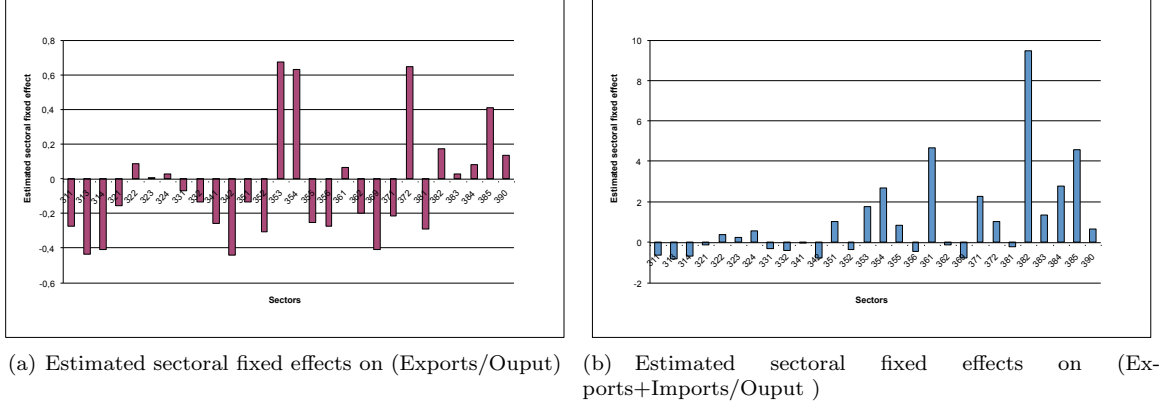


Figure 1: Estimated sectoral fixed effect

¹⁵Numbers at the top of the bars represent standard errors.

Moreover, the manufacturing sectors are heterogeneous in terms of trade openness. Hence factoral reallocations in favour of the tradable sub-sectors are likely to happen inside the manufacturing sector. Figures 2(a) and 2(b) plot the sectoral fixed effects γ_s obtained by the regression $OPEN_{i,t,s} = \gamma_i + \gamma_t + \gamma_s$, where γ_i and γ_t are country and year fixed effects, and $OPEN_{i,t,s}$ is the ratio for the sector s in country i at time t , of exports over GDP and exports plus imports over GDP for figure 2(a) and 2(b) respectively. The figure 2(a) and 2(b) show that the degree of openness varies across the sub-sectors of the manufacturing.



Consider now the decomposition of the aggregate variation in a "within" and a "between" composition term described in subsection 3.1, equation (23). The decomposition of the changes in the labour share between $t - 1$ and $t + 2$ is :

$$LS_{i,t+2} - LS_{i,t-1} = \underbrace{\sum_{s=1}^n (LS_{i,t+2,s} - LS_{i,t-1,s}) \phi_{i,t-1,s}}_{\text{within effect}} + \underbrace{\sum_{s=1}^n (\phi_{i,t+2,s} - \phi_{i,t-1,s}) LS_{i,t+2,s}}_{\text{composition effect}}. \quad (29)$$

Performing this decomposition of the changes in the aggregate labour share for each crisis episode gives us a first indication of the importance of the two effects when a crisis happens. The distribution of the variation of the aggregate labour share and of the within effect term are similar : about 70% of the observations are negative, and the magnitude of the variations is similar in the two cases. Finally, we plot in figure 2 the share of the "within" and of the "between" term in the variation of the aggregate labour share to appraise the relative importance of the two effects. Figure 2 suggests that most of the observed variations of the labour share are within sectors variations.

II.4 ECONOMETRIC ANALYSIS

II.4.1 REGRESSIONS IN LEVEL

Our first specification, equation (20), regresses the labour share on our variable of interest, the currency crisis dummy, 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 , but our results are virtually



Figure 2: Shares of the within and the between term in the total variation of the LS

identical if we introduce them at date $t - 1$, as treatment for endogeneity. Results are reported in table 2. We see that crises negatively impact the labour share but with a lagged effect since the coefficient on $Crisis_t$ is not significant whereas those on $Crisis_{t-1}$, $Crisis_{t-2}$ and $Crisis_{t-3}$ are. Note that it is the crisis two years before which has the strongest impact on the labour share. Surprisingly, our proxy for the capital-output ratio is not significant. The education variable is positive and significant, in line with Daudey and Decreuse [16]. Adding our control variables does not change the significance of the crisis dummies and increases some of their coefficient in absolute terms when the de facto financial openness variable is added¹⁶.

We next turn to estimations on sectoral data (i.e., the 28 manufacturing sectors), and estimate the model described by equation (21). Sectoral estimations are weighted by the sector shares at time t . Once again we regress the labour share on crisis at t , at $t - 1$, at $t - 2$ and at $t - 3$ to see the impact of the crisis at different stages of financial turbulence period. Results are reported in table 3. We can derive several lessons from those regressions. One year after the crisis, the labour share is about 2 points lower than it would have been if the crisis had not occurred and stabilizes at this level 2 years after the crisis. The labour share starts recovering and three years after the crisis it is only 1.5 points lower than what it would have been in the absence of a crisis.¹⁷

¹⁶For example, the coefficient of $Crisis_{t-1}$ increases of about 0.25 points.

¹⁷The coefficient of $Crisis_{t-4}$ is close to zero and not significant, suggesting that 4 years after, the labour share goes back to its initial value.

Aggregate Data	a	b	c	d	e
$Crisis_t$	0.31 (0.94)	0.43 (0.92)	0.55 (0.87)	-0.03 (0.83)	0.14 (0.82)
$Crisis_{t-1}$		-2.19** (0.86)	-1.91** (0.86)	-2.14** (0.84)	-2.17** (0.84)
$Crisis_{t-2}$			-2.22*** (0.81)	-2.19*** (0.77)	-2.27*** (0.79)
$Crisis_{t-3}$			-1.80** (0.81)	-1.68** (0.80)	-1.74** (0.82)
IY				0.57 (7.35)	0.96 (7.38)
school				2.71*** (0.74)	2.77*** (0.74)
OPENK (de jure)				-0.55 (0.43)	
OPENK (de facto)					3.00 (1.89)
OPENT				-0.10*** (0.03)	-0.12*** (0.04)
Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.91	0.92	0.92	0.92	0.92
Nb of Observations	324	321	318	318	318

* p<0.10, ** p<0.05, *** p<0.01

Table 2: Aggregate Data- Core Regressions-All countries

Sectoral Data	a	b	c	d	e
$Crisis_t$	0.16 (0.49)	0.28 (0.48)	0.40 (0.45)	-0.17 (0.43)	-0.02 (0.43)
$Crisis_{t-1}$		-2.09*** (0.45)	-1.82*** (0.44)	-2.01*** (0.42)	-2.06*** (0.43)
$Crisis_{t-2}$			-2.07*** (0.43)	-2.00*** (0.41)	-2.09*** (0.41)
$Crisis_{t-3}$			-1.66*** (0.43)	-1.48*** (0.41)	-1.55*** (0.43)
IY				4.04*** (0.98)	4.10*** (0.98)
school				2.79*** (0.42)	2.85*** (0.42)
OPENK (de jure)				-0.50** (0.22)	
OPENK (de facto)					3.16*** (1.01)
OPENT				-0.12*** (0.02)	-0.14*** (0.02)
Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.85	0.85	0.86	0.86	0.86
Nb of Observations	9110	9017	8936	8936	8936

* p<0.10, ** p<0.05, *** p<0.01

Table 3: Sectoral Data-Core Regressions-All countries

Controlling for capital intensity does not change either the magnitude of the coefficients of the crisis, nor their significance level. Note that, contrary to what we obtain in the estimations at the aggregate level, the coefficient on capital intensity is significantly positive, which suggests an elasticity of substitution between labour and capital greater than one.¹⁸

Concerning education, the coefficient is once again significant and positive.

Financial openness has the expected negative sign only when we measure it by the *de jure* index. This is in line with the studies which use a *de jure* measure to appraise the relationship between financial openness and the labour share, and conclude on a negative one (see Harrison [27] and Jayadev [29]). On the contrary, there is a strong positive and significant correlation between *de facto* financial openness and the labour share.

This is a surprising result at first sight but the correlation coefficient between the two variables of financial openness is of 0.33 suggesting a quite weak relationship between them.

Lastly, as expected, trade openness has a significant negative impact on the labour share, in line with Ortega and Rodriguez [40].

Next we consider whether results differ for developing and developed countries since crises are of a different nature depending on the level of development. We use the classification of the World Bank¹⁹ to divide the sample into two subsamples according to the level of per capita income, and we run the regressions in equation 21 on both the whole sample and on each subsample. Results are reported in table 4.

¹⁸This is in line with Hamermesh [26] who shows that most of the studies he surveys find that labour and capital are complements.

¹⁹In the sample, six countries are developed countries, and fourteen are developing, see appendix.

Sectoral Data	All	All	Developed	Developed	Developing	Developing
$Crisis_t$	-0.170 (0.43)	-0.022 (0.43)	-0.222 (0.88)	0.256 (0.74)	-0.117 (0.40)	-0.236 (0.42)
$Crisis_{t-1}$	-2.012*** (0.42)	-2.063*** (0.43)	-2.348*** (0.81)	-2.158*** (0.74)	-1.130*** (0.42)	-1.203*** (0.43)
$Crisis_{t-2}$	-1.998*** (0.41)	-2.092*** (0.41)	-0.830 (0.78)	-0.209 (0.76)	-1.700*** (0.46)	-1.719*** (0.45)
$Crisis_{t-3}$	-1.480*** (0.41)	-1.550*** (0.43)	-0.917 (0.91)	-0.461 (0.97)	-1.204*** (0.39)	-1.231*** (0.39)
IY	4.036*** (0.98)	4.096*** (0.98)	19.220*** (3.20)	18.105*** (2.92)	2.319** (0.92)	2.285** (0.92)
school	2.787*** (0.42)	2.848*** (0.42)	-0.269 (0.95)	1.044 (0.98)	4.651*** (0.55)	4.539*** (0.56)
OPENK (de jure)	-0.504** (0.22)		-2.460*** (0.63)		0.289 (0.19)	
OPENK (de facto)		3.159*** (1.01)		10.611*** (1.90)		0.164 (0.99)
OPENT	-0.118*** (0.02)	-0.138*** (0.02)	-0.470*** (0.08)	-0.588*** (0.08)	-0.092*** (0.02)	-0.088*** (0.02)
Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.862	0.862	0.691	0.700	0.657	0.657
Nb of Obs	8936	8936	3458	3458	5478	5478

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Core Regressions-All countries-Developed Countries-Developing Countries

Again we do not observe any instantaneous impact of the financial crisis on the labour share. For both types of countries, the labour share falls one year after the crisis occurs but the impact is stronger in the developed countries (more than 2 points) than in the developing ones (about 1.2 points). A major difference between the two types of countries is that the effect of financial crises lasts longer in developing countries since 3 years after they have occurred the labour share is still about 1.2 points lower than its 'normal' value, whereas in developed countries financial crises affect the labour share only in the year after. The fact that capital intensity is higher in developed countries than in the developing ones could explain that the IY coefficient is higher for developed countries than for developing ones, given that the labour share is a positive function of capital-labour ratio when the two factors are complements. Human capital has a positive coefficient in developing countries, but is not significant in the developed ones. As in the aggregate estimations, trade has a negative and significant impact for both groups of countries. However, in the light of the Heckscher-Ohlin-Samuelson model, we would have expected a positive sign for the developing countries where labour is the abundant factor. Actually, this result captures the fact that trade increases competition which hurts labour's power, whatever the type of the country. Nevertheless, the impact is much less negative for developing countries.

De jure financial openness is negatively correlated with the labour share in developed countries. However, signs reverse with the de facto measure of financial openness and the relationship is positive, very strong and significant, which let us to think that the relationship between financial liberalization and the labour share in rich countries deserves to be reinvestigated. In developing countries neither the

Developed Countries	ΔLS_{it}	Within	Between	$\Delta LS_{i,t,s}^*$ $\phi_{i,t-1,s}$	$\Delta \phi_{i,t,s}^*$ $LS_{i,t,s}$	ΔLS_{its} (weighted)
$Crisis_t$	0.52 (0.78)	0.44 (0.87)	0.09 (0.12)	0.03 (0.04)	0.01 (0.02)	0.42 (0.40)
$Crisis_{t-1}$	-1.25* (0.66)	-1.20* (0.67)	-0.05 (0.14)	-0.09** (0.03)	-0.00 (0.01)	-1.16*** (0.34)
$Crisis_{t-2}$	0.53 (0.77)	0.49 (0.82)	0.04 (0.17)	0.04 (0.04)	-0.01 (0.02)	0.63 (0.39)
ΔIY	34.24* (17.52)	32.03* (18.99)	2.21 (2.65)	0.34** (0.14)	-0.27*** (0.10)	17.22*** (4.11)
$\Delta school$	-2.52 (2.25)	-1.59 (2.34)	-0.93** (0.45)	-0.13 (0.12)	-0.05 (0.06)	-1.94 (1.20)
$\Delta OPENK$	4.50 (2.94)	3.84 (3.03)	0.66 (0.50)	0.39** (0.17)	0.03 (0.08)	4.78*** (1.64)
$\Delta OPENT$	-0.25*** (0.08)	-0.25*** (0.09)	0.00 (0.02)	-0.02*** (0.00)	0.00 (0.00)	-0.26*** (0.05)
Dummies (time)	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.57	0.52	0.37	0.06	0.01	0.27
Nb of Obs	118	118	118	3235	3235	3235

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. OPENK is a de facto measure

Table 5: Regressions in Differences - Developed Countries

de jure nor the de facto index is significantly correlated to the labour share.

II.4.2 INTRA-SECTORAL DECREASE VS REALLOCATION EFFECTS : REGRESSIONS IN DIFFERENCE

In this subsection we investigate whether or not the negative impact of financial crises could be due to the reallocations caused by the crisis. We have previously seen in the theoretical intuitions that financial crises may lead to changes in the sectoral composition of the economy. Our first look at the data in figure 2 seemed to indicate that changes within sectors were the main cause of the observed aggregate variations. To answer carefully this question, we perform the six estimations in differences described in subsection 3.1.²⁰ Results are reported in table 5 for developed countries and in table 6 for developing countries.

In both types of countries the negative impact of financial crises reflects a negative impact of the crises on the labour shares *within* sectors. Comparing the coefficients of $Crisis_{t-1}$ in the 3 first columns for developed countries, we can see that about 96% of the decline of the aggregate labour share (-1.25) is explained by declines within sectors (-1.20), and that the between term explains only 4% of the decline²¹. For developing countries, 82% of the decline is explained by a decrease within sectors, since the coefficient of $Crisis_{t-1}$ is equal to -1.83 when we regress the within term and the overall impact is of -2.24 . The small coefficients on crises in the between term regression could invite us to think that

²⁰We only keep the de facto measure of financial openness because we believe that its variability in time is greater than the de jure one, which allows us to keep variability for this variable when we differentiate in time this variable

²¹Notice that if we sum the coefficient associated to crisis in the "within" regression, and in the "between" one we exactly obtain the coefficient in the regression where ΔLS is used as a dependant variable.

DC	ΔLS_{it}	Within	Between	$\Delta LS_{i,t,s}^*$ $\phi_{i,t-1,s}$	$\Delta \phi_{i,t,s}^*$ $LS_{i,t,s}$	ΔLS_{its} (weighted)
$Crisis_t$	-2.24*** (0.79)	-1.83*** (0.67)	-0.40 (0.30)	-0.14*** (0.04)	-0.01 (0.01)	-2.01*** (0.39)
$Crisis_{t-1}$	-0.30 (0.78)	-0.18 (0.68)	-0.12 (0.33)	-0.02 (0.03)	-0.01 (0.01)	-0.25 (0.37)
$Crisis_{t-2}$	0.53 (0.54)	0.33 (0.57)	0.20 (0.34)	0.03 (0.03)	0.01 (0.01)	0.45 (0.29)
ΔIY	7.03 (4.38)	-0.82 (2.83)	7.86*** (2.53)	0.03* (0.02)	-0.02* (0.01)	2.28*** (0.82)
$\Delta school$	2.76 (1.89)	1.67 (1.66)	1.09 (0.90)	0.16** (0.08)	0.04 (0.03)	2.23** (0.97)
$\Delta OPENK$	-3.16 (1.92)	-1.22 (1.66)	-1.94** (0.83)	-0.17* (0.10)	-0.11*** (0.03)	-2.31** (1.01)
$\Delta OPENT$	-0.13*** (0.04)	-0.12*** (0.04)	-0.01 (0.02)	-0.01*** (0.00)	0.00 (0.00)	-0.13*** (0.02)
Dummies (time)	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.38	0.35	0.38	0.04	0.01	0.17
Nb of Obs	187	187	187	5317	5317	5317

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. OPENK is a de facto measure

Table 6: Regressions in Differences - Developing Countries (DC)

the two kinds of sectoral reallocation effects described in the theoretical part have opposite effects and compensate each other. None of the crisis coefficients are significant in the estimation of the between term (column 3), which suggests that the reallocation effects actually fail to explain the observed decline of the manufacturing aggregate labour share. Results in column 5 show once again that sectoral reallocation across manufacturing sectors does not explain the decrease of the aggregate labour share since all the coefficients are insignificant, despite a higher number of observations. Looking at columns 4 and 6, we conclude once again that most of the observed decrease of the labour share in the manufacturing sector is due to a decrease in the labour share within sectors.²²

II.4.3 ACCOUNTING FOR ENDOGENEITY AND AUTOCORRELATION

In this sub-section, we check the robustness of the relationship between currency crises and the labour share. There are several reasons why this statistical relationship may be spurious. Endogeneity and autocorrelation biases are due to omitted variables causing both currency crises and the labour share, and persistence of the dependent variable.

Endogeneity may arise for two reasons. On the one hand, the regressors may be correlated with the error terms in the fixed effects model as the explanatory variables and the labour share are general equilibrium variables. As such, they may be affected by correlated shocks, generating a statistical bias in the fixed effects estimator. On the other hand, the labour share may directly affect the probability

²²We have performed a set of regressions for each sector whose results corroborate this finding : for almost two third of the sectors the labour share significantly falls after a crisis and only one sector ('Other non-metallic mineral products') exhibits a significant and positive impact of the crisis on the labour share

a crisis occur for reasons that are outside the theoretical model presented above. For example, a low labour share may attract capital inflows, as wages to productivity are low, and increase the probability of a crisis occurring. A high labour share may also lead to a crisis because it reduces investors' returns. If the past labour share is also correlated with the current one (residual autocorrelation), this may lead to biased estimated coefficients. This type of bias cannot be addressed by lagging the regressors, because the lagged regressors would also be correlated with the error terms.

To address these two sources of bias, we use the system-GMM estimator due to Blundell and Bond [10]. This estimator proves to be more stable vis-à-vis sample and instrument alterations than the Arellano and Bond [4] difference estimator (we nevertheless also perform an Arellano and Bond estimation as a robustness check). Formally, the model is written as follows:

$$\begin{aligned}
\Delta LS_{its} &= \beta_1 \Delta LS_{i,t-1,s} + \beta_2 \Delta CRISIS_{it} + \beta_3 \Delta CRISIS_{it-1} + \beta_4 \Delta CRISIS_{it-2} \\
&\quad + \beta_5 \Delta X_{i,t,s} + a_t + \Delta \varepsilon_{i,t,s} \\
LS_{i,t,s} &= a_1 LS_{i,t-1,s} + a_2 CRISIS_{it} + a_3 CRISIS_{it-1} + a_4 CRISIS_{it-2} \\
&\quad + a_5 X_{i,t,s} + a_t + \varepsilon_{its}
\end{aligned} \tag{30}$$

In both components, the lagged dependent variable is correlated with the error terms and must be instrumented. In addition, crisis terms and control variables may also be weakly exogenous, which also requires an instrumenting strategy. In the absence of good instruments, the set of instruments only contains lagged endogenous regressors and exogenous variables. In the difference submodel, the differenced lagged labour share is instrumented by past levels of the labour share (starting with LS_{ist-2} , not correlated with $\Delta \varepsilon_{ist} = \varepsilon_{ist} - \varepsilon_{ist-1}$), while the lagged labour share is instrumented by past differences of the labour share in the level submodel (starting with ΔLS_{ist-1}).

We add time dummies to account for common period shocks (preventing the most likely form of cross-individual correlation) and we use sector shares to weight observations. The model is estimated by two-step GMM, while reported squared errors feature Windmeijer [50] correction.

We proceed in several steps and mainly focus on developing countries because regressions in differences show that the impact of currency crises on the labour share is higher than in the developed ones. The results are remarkably consistent across the various system-GMM estimations we perform. Specification tests like the Hansen tests of over-identifying restrictions, and the Arellano and Bond [4] test (AB test) of second-order autocorrelation have to be performed routinely when using GMM-estimation of panel dynamic models. Table 7 displays our results, where columns *a* to *f* report figures for developing countries, and column *g* to *h* figures for developed.

In column *a*, we first consider the crisis variable as exogenous whereas all other variables are treated as weakly exogenous. Standard treatment for endogenous variables is to use all its lags starting with the second one X_{t-2} , which should be uncorrelated with ε_t and ε_{t-1} (for the model in difference). In column *b* we choose to limit the number of lags to instrument the labour share to 10. Indeed, very old patterns of the labour share may affect openness policies. Those policies aim at attracting capital inflows as a development strategy, and increase the risk a currency crisis occurs at date *t*. This specification, supported by an economic argument, seems better as Hansen test P-value increase to 0.33 whereas

instruments couldn't be considered as valid in the previous regression. In column *c*, crisis regressors are weakly exogenous. The crisis in t is instrumented with all its past values from lag 2. Crisis in $t - 1$ is considered as predetermined and can be instrumented with all its past values from lag 1. Crisis in $t - 2$ can be considered as exogenous as it should not be correlated with variations of errors in t ($\varepsilon_t - \varepsilon_{t-1}$). The P-value of the Hansen test is drastically reduced (0.145). This may suggest that moment conditions associated with crisis are not equal to zero. Furthermore, past values of crisis variables may be poorly related to present values due to the fact that crisis is a particular event. In column *d* we add to the set of instruments several variables external to the model which have an impact on the probability that a crisis occurs but which should not be correlated with the labour share. Those instruments are exports to GDP, variation in GDP growth rate, M2 monetary aggregate to foreign reserves, foreign reserves to external debt, short term debt to foreign reserves, variation in the terms of trade, and US interest rate. All variables enter in the set of instruments one period lagged. P-value of the Hansen test rise to 0.19. In column *e*, we use deeper lags to instruments crisis. Previous regressions show that crisis in $t - 2$ may not be a good instrument for crisis in t . Crisis in $t - 2$ has a significant impact on the labour share in t , and this is probably so because crises have long lasting effect. In regressions of Tables 2 and 3, the labour share (in level) only recovers after 4 years. As a result, only crisis observations starting from $t - 5$ should be valid instruments for crisis in t , $t - 1$ or $t - 2$. Hansen test P-values increases to 0.33. In column *f*, we run the regression specification of column *e* using the simplest unstable estimator of Arellano and Bond [4] as a robustness check.

The AB test suggests that we cannot reject the null hypothesis of absence of autocorrelation between residual $\Delta\varepsilon_t$ and $\Delta\varepsilon_{t-2}$ ($\Delta\varepsilon_t$ and $\Delta\varepsilon_{t-1}$ are correlated by construction). As a result, labour share in $t - 2$ is a valid instrument for labour share in $t - 1$. The decrease of the labour share for developing countries relative to estimates in difference is cut by about 10% to 40% depending on the GMM specification. The labour share recovers more rapidly.

For developed countries we use the specification of column *d*.²³ Indeed crisis in $t - 2$ should be a valid instrument for developed countries as estimations of Tables 2 and 3 suggest that the impact of currency crises quickly disappears. Column *g* reports results using the Blundell and Bond [10] estimator. Nevertheless, the AB test for autocorrelation at second order is not satisfied. We run the AB test for higher order of autocorrelation. Residuals in difference appear to be also correlated at 3rd order. The correlation vanishes at 4th order. This suggests that 3rd and 4th lags of the labour share and of the regressors are invalid instruments as they are correlated with both regressors and labour share in t . In column *h*, we instrument the labour share in $t - 1$ (in difference) with the labour share in $t - 4$, other regressors in t , $t - 1$, $t - 2$ with their value in $t - 4$. As expected, P value of the Hansen test increases drastically. For developed countries, the coefficient associated with crisis is much higher than former estimates in difference but the dynamic remains the same and the labour share recovers after one period.

²³We keep only the variation in growth rate, export to GDP and the US real interest rate as external instruments. Other external instruments used previously are not or very badly available for developed countries.

Specification	a	b	c	d	e	f	g	h
ls _{t-1}	0.44*** (0.05)	0.44*** (0.05)	0.51*** (0.04)	0.44*** (0.04)	0.44*** (0.04)	0.27*** (0.06)	0.74*** (0.04)	0.70*** (0.05)
Crisis _t	-1.95*** (0.39)	-1.91*** (0.39)	-1.27*** (0.45)	-1.64*** (0.38)	-1.52*** (0.36)	-1.44*** (0.34)	-0.40 (0.86)	-1.17 (1.37)
Crisis _{t-1}	-1.31*** (0.44)	-1.26*** (0.46)	-1.08** (0.45)	-1.12*** (0.35)	-1.67*** (0.50)	-1.66*** (0.44)	-2.91*** (0.55)	-2.82*** (0.71)
Crisis _{t-2}	-0.90** (0.45)	-0.87* (0.46)	-0.92** (0.41)	-0.97** (0.43)	-0.46 (0.47)	-0.90** (0.37)	-0.62 (0.79)	-0.78 (0.93)
IY	0.74 (1.72)	-0.29 (1.54)	1.24 (1.32)	1.93 (1.32)	-0.53 (1.31)	2.19 (2.09)	-2.25 (3.01)	16.05** (7.00)
school	1.39* (0.76)	1.20 (0.80)	0.24 (0.75)	0.65 (0.51)	0.47 (0.55)	3.96*** (0.72)	-0.80** (0.34)	1.52*** (0.48)
OPENK	-3.22*** (1.24)	-2.82** (1.32)	-3.13*** (1.04)	-2.43*** (0.85)	-2.49*** (0.86)	-1.70* (0.98)	2.10 (1.92)	2.12** (0.84)
OPENT	0.02 (0.02)	0.03 (0.02)	0.03*** (0.01)	0.04*** (0.01)	0.05*** (0.01)	-0.11*** (0.03)	0.12*** (0.02)	-0.03 (0.03)
time Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nb of Obs.	6029	6029	6029	5430	5430	4851	3706	3706
Nb of Groups	317	317	317	317	317	317	170	170
Nb of Instruments	175	150	175	182	178	171	163	150
Hansen test (p-value)	0.083	0.329	0.145	0.188	0.332	0.209	0.253	0.437
AR (2) test (p-value)	0.901	0.745	0.658	0.976	0.831	0.141	0.001	0.001

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: System GMM estimations

III CONCLUSION

In this paper we investigate the relationship between currency crises and the labour share. We first develop a theoretical model explaining the channel through which currency crisis are expected to impact the labour share and highlight two types of effects: within-sector changes induced by modifications in the relative bargaining power of workers, and composition effects induced by structural change.

As currency crises are characterized by exchange rate depreciation and capital outflows, factors reallocate from the non-tradable sectors to the tradable ones, and from the capital intensive sectors to the labour intensive ones. Hence the aggregate labour share should increase or decrease, depending on the relative capital intensity of the tradable sector, and on the elasticity of substitution between the two types of sectors. Moreover, as capital is relatively more mobile than labour, currency crises benefit to the former because outside opportunities of labour are only 'local' while the ones of capital are 'global'. This last effect implies a decrease of the labour shares within sectors.

Second, we perform estimations on manufacturing sectoral data. We find that currency crises are associated with an average decrease in the labour share of 2 points and that almost all of the decrease in the aggregate labour share in manufacturing is due to within sector effects. This conclusion is in line with Rodrik type argument that financial distress hurts labour in the bargaining process. We do not conclude that there are no reallocation forces at stake during currency crises, but rather that those reallocations across manufacturing sectors do not explain the bulk of the decrease in the manufacturing labour share. Of course, using data covering only the manufacturing sector does not allow us to test some of the reallocations between tradable and non-tradable sectors. Nevertheless, non traded good still exist in the manufacturing sector.

A drawback of the paper is that it is difficult to know whether the decrease in the labour share is due to the crisis itself or to other fundamentals which are correlated with the probability that a crisis occurs. Since there is no available instrument for the crisis, we tackle this question using system GMM estimations and routine over identification tests suggest that moment conditions are satisfied.

Finally, note that the decrease observed within each sector could be related to reallocations at a more disaggregated level than ours and not to a modification in the bargaining strength. We leave such a research program for future works.

IV APPENDIX

IV.1 PROOF OF PROPOSITION 2

The proof follows Acemoglu and Guerrieri [2]. To simplify, we assume, without implications, that the exchange rate is such that $f(e) = 1$ and does not modify the relative demand for goods.

In equilibrium, the unemployment rate is the same in both sectors. This involves the equalization of the marginal products of capital and labour in the two sectors. Using the relative demand function 3 we

obtain

$$\gamma(1 - \alpha_x) \left(\frac{Z}{X} \right)^{\frac{1}{\sigma}} \frac{X}{L_x} = (1 - \gamma)(1 - \alpha_y) \left(\frac{Z}{Y} \right)^{\frac{1}{\sigma}} \frac{Y}{L_y} \quad (31)$$

$$\gamma(\alpha_x) \left(\frac{Z}{X} \right)^{\frac{1}{\sigma}} \frac{X}{K_x} = (1 - \gamma)(\alpha_y) \left(\frac{Z}{Y} \right)^{\frac{1}{\sigma}} \frac{Y}{K_y} \quad (32)$$

We define the share of capital and labour allocated in sector x as

$$s_K = \frac{K_x}{K} \text{ and } s_L = \frac{L_x}{L} \quad (33)$$

We also have $1 - s_K = K_y/K$ and $1 - s_L = L_y/L$. Combining (31) and (32), we obtain

$$s_K = \left[1 + \left(\frac{\alpha_y}{\alpha_x} \right) \left(\frac{1 - \gamma}{\gamma} \right) \left(\frac{X}{Y} \right)^{\frac{1 - \sigma}{\sigma}} \right]^{-1} \quad (34)$$

and

$$s_L = \left[1 + \left(\frac{\alpha_x}{\alpha_y} \right) \left(\frac{1 - \alpha_y}{1 - \alpha_x} \right) \left(\frac{1 - s_K}{s_K} \right) \right]^{-1} \quad (35)$$

Equation (35) shows that the share of labour in sector x is increasing in the share of capital in this sector. Using the two production functions of intermediates, we can write $X/Y = s_L^{1 - \alpha_x} (1 - s_L)^{-\alpha_y} (s_K)^{\alpha_x} (1 - s_K)^{-\alpha_y} L^{\alpha_y - \alpha_x} K^{\alpha_x - \alpha_y} h_x/h_y$. Substituting this expression in (34) and using the implicit function theorem we show that

$$\frac{d \ln s_K}{d \ln K} = \frac{(1 - \sigma)(\alpha_y - \alpha_x)(1 - s_K)}{1 + (1 - \sigma)(\alpha_y - \alpha_x)(s_K - s_L)} > 0 \Leftrightarrow (\alpha_y - \alpha_x)(1 - \sigma) > 0 \quad (36)$$

If the elasticity of substitution between the two intermediates is less than unity, the fraction of capital allocated in the labour-intensive sector increases and the fraction of capital allocated in the capital-intensive sector decreases. The result is the same for the fraction of labour as it moves together with the fraction of capital in sector x .

The impact on the labour share can be derived as follows. Equation (18) gives the impact of a modification in the share of labour allocated in sector x on the share of sector x in total value added (π) and (17) gives the impact of π on the aggregate labour share.

IV.2 DATA

IV.2.1 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 the 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.

IV.3 SECTORIAL REGRESSION IN LEVEL

Here we add the regression results of following the estimated model to show that the labour share stops falling 4 years after the crisis occurs.

$$LS_{its} = a_i + a_t + a_s + \beta_1 CRISIS_{it} + \beta_2 CRISIS_{it-1} + \beta_3 CRISIS_{it-2} + \beta_4 CRISIS_{it-3} + \beta_5 CRISIS_{it-4} + \gamma_1 I/Y_{its} + \gamma_2 SCHOOL_{it} + \gamma_3 OPENK_{it} + \gamma_4 OPENT_{it} + \varepsilon_{its} \quad (37)$$

IV.4 REGRESSIONS IN LEVEL WITHIN EACH SECTOR

We have performed 28 regressions on each sectors, whose results show that two thirds of the sectors exhibit a significant decrease if the labour share after a crisis. One sector exhibits a significant and positive impact of the crisis on the labour share.

Core Regressions	a	b	c	d	e
$Crisis_t$	0.13 (0.49)	0.25 (0.48)	0.36 (0.46)	-0.16 (0.43)	0.01 (0.44)
$Crisis_{t-1}$		-2.15*** (0.45)	-1.84*** (0.44)	-2.06*** (0.42)	-2.07*** (0.43)
$Crisis_{t-2}$			-2.07*** (0.43)	-1.99*** (0.41)	-2.08*** (0.41)
$Crisis_{t-3}$			-1.59*** (0.43)	-1.44*** (0.42)	-1.48*** (0.43)
$Crisis_{t-4}$			-0.05 (0.48)	0.10 (0.45)	0.22 (0.46)
IY				3.42*** (0.87)	3.47*** (0.87)
school				2.77*** (0.42)	2.81*** (0.42)
OPENK (de jure)				-0.43* (0.23)	
OPENK (de facto)					2.86*** (0.96)
OPENT				-0.11*** (0.02)	-0.13*** (0.02)
Dummies	Yes	Yes	Yes	Yes	Yes
R-squared	0.85	0.86	0.86	0.86	0.86
Nb of Observations	8915	8799	8741	8741	8741

* p<0.10, ** p<0.05, *** p<0.01

Table A-I: Core Regressions-All countries

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Sectors	311	313	314	321	322	323	324
<i>Crisis_t</i>	-0.61 (0.71)	0.24 (1.05)	1.61 (1.87)	0.36 (1.35)	0.86 (1.36)	-0.84 (1.29)	-1.02 (1.59)
<i>Crisis_{t-1}</i>	-2.19*** (0.81)	-1.26 (1)	2.18 (1.90)	-2.63** (1.28)	-1.17 (1.20)	-1.71 (1.18)	-1.92 (1.64)
<i>Crisis_{t-2}</i>	-2.14*** (0.74)	-0.20 (0.99)	0.58 (1.90)	-2.33** (1.15)	-1.16 (1.30)	-2.48* (1.29)	-2.29 (1.52)
<i>Crisis_{t-3}</i>	-1.89** (0.80)	0.01 (0.94)	1.81 (1.77)	-1.97* (1.13)	-1.60 (1.37)	-1.88 (1.30)	-0.28 (1.62)
R-squared	0.91	0.83	0.66	0.83	0.86	0.84	0.73
Nb of Obs.	318	316	285	318	314	310	316
Sectors	331	332	341	342	351	352	353
<i>Crisis_t</i>	1.33 (1.44)	0.88 (1.31)	0.96 (1.37)	-1.35 (1.11)	0.75 (0.97)	1.02 (0.92)	0.96 (1.18)
<i>Crisis_{t-1}</i>	-2.09 (1.45)	-2.21 (1.36)	-1.43 (1.30)	-1.96* (1.15)	-2.20*** (0.83)	-0.94 (1.03)	0.24 (0.97)
<i>Crisis_{t-2}</i>	-2.26 (1.39)	-1.04 (1.37)	-2.20* (1.12)	-1.85* (1.11)	-1.47 (0.90)	-2.19** (0.97)	2.15 (1.60)
<i>Crisis_{t-3}</i>	-1.45 (1.34)	-0.13 (1.25)	-0.28 (1.21)	-2.27** (1.01)	0.25 (0.88)	-1.72* (1.01)	0.50 (0.88)
R-squared	0.76	0.78	0.80	0.85	0.85	0.81	0.66
Nb of Obs.	317	311	317	318	318	314	263
Sectors	354	355	356	361	362	369	371
<i>Crisis_t</i>	1.29 (1.65)	0.25 (1.39)	-0.04 (0.95)	-2.86* (1.49)	-0.05 (1.40)	2.07* (1.05)	0.36 (1.84)
<i>Crisis_{t-1}</i>	-0.16 (1.75)	-1.49 (1.48)	-1.71* (1.01)	-3.09** (1.45)	-1.82 (1.47)	-0.62 (1.17)	-2.99* (1.54)
<i>Crisis_{t-2}</i>	-2.37 (1.51)	-1.75 (1.54)	-2.23** (0.98)	-3.96** (1.57)	-2.02 (1.52)	-1.17 (0.94)	-3.75** (1.48)
<i>Crisis_{t-3}</i>	-0.17 (2.39)	-0.10 (1.50)	0.25 (0.91)	-1.84 (1.55)	-1.71 (1.31)	0.42 (0.90)	-2.23 (1.50)
R-squared	0.73	0.81	0.87	0.75	0.81	0.84	0.80
Nb of Obs.	231	315	318	316	309	315	309
Sectors	372	381	382	383	384	385	390
<i>Crisis_t</i>	0.61 (2.23)	-0.45 (1.12)	-1.09 (1.47)	-1.06 (1.07)	1.43 (1.41)	-0.36 (1.92)	-0.12 (1.27)
<i>Crisis_{t-1}</i>	-3.33* (1.71)	-2.46** (1.13)	-3.15** (1.46)	-2.76** (1.10)	0.02 (1.43)	-2 (1.98)	-1.74 (1.31)
<i>Crisis_{t-2}</i>	-0.48 (2.07)	-3.19*** (1.04)	-3.44** (1.57)	-1.84* (1.09)	-3.03** (1.34)	-3.05 (1.92)	-2.85** (1.30)
<i>Crisis_{t-3}</i>	2.09 (2.39)	-1.82 (1.11)	-4.72*** (1.45)	-2.13** (1.07)	-2.28* (1.34)	-1.71 (1.49)	-1.41 (1.31)
Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.80	0.88	0.79	0.87	0.88	0.70	0.79
Nb of Obs.	297	318	310	310	310	310	315

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-II: Regressions within each sector