

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: within sector effects and across sector effects. We build a descriptive model with a tradable sector and a non-tradable one which differ in their factor intensities. Labour market is characterized by search frictions and goods market by shadow entry costs. Our model describes two sectoral reallocation effects resulting from exchange rate depreciation and capital outflows. These two sectoral effects can move in opposite directions, depending on whether the tradable sector is capital or labour intensive. Our model also highlights that crises erode the bargaining power of workers so that within sectors, crises lower the labour share. We also perform estimations on manufacturing sectoral panel data for 20 countries which have experienced currency crises. The empirical analysis concludes that currency crises lower the aggregate manufacturing labour share by 2 points on average and that this decline is not explained by reallocations across manufacturing sectors.

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

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1 Introduction

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 (2009), Hutchison and Noy (2005) or Gupta et al. (2007)). 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. (2002) and Galbraith and Lu (2009)). 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 (2001) and Diwan (2002) who finds that the aggregate labour share falls sharply after a financial crisis. Diwan argues that the reason for this is that the high mobility of capital during crises reduces the bargaining power of workers and hence the labour share. 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 (1997), Poterba (1999), and Harrison (2002).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 (2007) and Checchi and García-Peñalosa (2008) and Checchi and García-Peñalosa (2009). 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. Blanchard and Giavazzi (2003) emphasize the role of product and labour market deregulations, while Blanchard (1997) and Acemoglu (2003) highlight the role of capital-biased technological change. Bentolila and Saint-Paul (2003) argue that movements in the labour share can be decomposed into three types of effects: changes in factor inputs (notably in the capital-output ratio), shifts in the relative demands of capital and labour (due, for instance, to biased technological progress), and movements off the relative demand schedule caused, for example, by changes in union bargaining power or labour adjustment cost. 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. Following Rodrik (1997) and Rodrik (1998), this literature maintains that globalization has eroded the

¹Note, however, that this variable was of major interest for classical economists. Kaldor (1955) 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 (1958) and Kravis (1959).

bargaining power of labour since the current wave of globalization is characterised by a greater mobility of capital relatively to labour, which increases the outside options of the former and hence its bargaining power. Ortega and Rodriguez (2002) focus on trade liberalization, and find a negative correlation between liberalization and the labour share. Harrison (2002) develops a model whereby financial globalization increases the relative bargaining power of capital and her empirical analysis finds that financial and trade openness are associated with a lower labour share. Jayadev (2007) shows, using panel data, that capital account openness has a negative impact on the labour share.

Diwan (2001, 2002) has examined the impact of financial crises² on the factor income distribution. He uses aggregate UN data and defines a financial crisis as a depreciation of the nominal exchange rate of at least 25%, a criterion inspired by Frankel and Rose (1996).³ His results indicate that the labour share falls sharply after a financial crisis and recovers partially some time later. There are two major drawbacks of Diwan's analysis. The first concerns his definition of crisis, since a nominal exchange rate depreciation could simply reflect high inflation episodes. Moreover, his criterion does not take into account the level of reserves and thus the fact that central banks can fight speculative attacks on foreign exchange markets. In fact, foreign investors can flee, anticipating a devaluation which finally does not occur, or attempt a speculative attack without success. In this case, currency market turbulences are not reflected by exchange rate variations but by the levels of reserves. In this paper we use a more suitable definition of currency crisis, as will be defined below, following Kaminsky and Reinhart (1999) or Hutchison and Noy (2006). The second question raised by Diwan's analysis is what causes the reduction in the labour share. He argues that capital mobility shifts the balance of power in favour of capital, in line with the literature examining the relationship between globalization and the labour share. Yet, reductions in the labour share could simply reflect a reallocation of output across sectors with different factor shares. In order to assess the role of these competing explanations, this paper will use sectoral data to distinguish amongst the different mechanisms through which crises can affect factor shares.

To examine the various channels, we construct a model based on Dutt et al (2008) who study the impact of trade on unemployment. We modify their model to focus on the impact of financial crises on the labour share, and assume that there is a tradable sector and a non-tradable one which differ in their capital intensity. The product market is characterized by shadow entry costs which imply that firms make 'super profits', while the labour market is characterized by search frictions. The combination of shadow entry costs and search frictions implies that workers are not paid their marginal product. As a result, wages depart from the marginal product of labour and movements in wages can lead to labour share changes. The model highlights two types of sectoral reallocation effects induced by the crisis, driven, respectively, by the exchange rate depreciation and by the reduction in the capital stock that characterize financial crises. The effect occurring through the exchange rate works as follows: the exchange rate depreciation induces factor flows to the tradable sector and an increase in the sector's output share, implying that the aggregate labour share decreases (increases) if the tradable sector is more capital (labour) intensive than the non-tradable one. The impact of a reduction in the aggregate capital stock implies aggregate factor

²Financial liberalization has given rise to a higher frequency of financial crises episodes, as shown for instance by Kaminsky and Reinhart (1999), Demirguc-Kent and Detragiache (1998) or Diaz-Alejandro (1985)

³Frankel and Rose (1996) define a currency crisis as a nominal depreciation of at least 25% during the year as long as this represents an increase in the rate of depreciation of at least a 10%.

reallocations from the capital intensive to the labour intensive sector, and tends to increase the labour share. Consequently, depending on whether the tradable sector is capital or labour intensive, the two reallocation effects may move in opposite directions.

The second type of effect examined by the model describes the impact of currency crises on the labour share within sectors. It echoes Diwan's argument that the high mobility of capital during crises hurts labour in the bargaining process due to the fact that outside opportunities of capital are "global" whereas those of labour are only "local". The resulting loss of labour's bargaining power leads to a decrease in the labour share within sectors. Note that the overall impact of crises on the labour share is in principle ambiguous, with two of the three effects just described tending to reduce it if the tradable sector is labour intensive, and one of them tending to increase it.

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 three 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 labour share from UNIDO sectoral data, and use the panel dataset of Kaminsky (2006) to identify currency crises. Currency crises are defined according to the index of Kaminsky and Reinhart (1999). The index 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.⁴ Our second aim is to understand to what extent changes in the overall labour share in manufacturing are due to within sector effects or to across sector effects. Lastly, we examine whether the impact of currency crises on the factor income distribution is the same for all kinds of currency crises.⁵ Following Kaminsky (2006) we distinguish several types of crises: crises linked to current account deterioration, fiscal imbalances, financial excess, foreign debt unsustainability, sudden stop, and self-fulfilling crises.

We find that currency crises are associated with a reduction in the aggregate manufacturing labour 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 and financial crises hurt labour, see Rodrik (1997), Jayadev

⁴Formally the index is : $I = \frac{\Delta e}{e} - \frac{\sigma_e}{\sigma_R} \frac{\Delta R}{R}$. 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 (1999) 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.

⁵Let us recall that in the theoretical literature, there are roughly speaking three generations of models which aim to explain the causes of currency crises. The first generation of models, based on the seminal work of Krugman (1979), shows that crises are due to persistent imbalances financed by monetary creation which conflict with limited amount of reserves : parity of exchange rate is no longer defensible and foreign investors disengage because they expect the ineluctable depreciation of currency (see Mundell (1963) for the incompatibility of fixed exchange rate, capital mobility, and independent monetary policy). Crises are qualified as standard in those kinds of models. The second generation tries to explain financial crises which occur in an environment where there is no imbalances and good fundamentals, see Obstfeld (1986), Obstfeld (1994) and Obstfeld (1996). Here the currency crisis results from speculative attacks and mainly concerns developed economies. The third generation of models, related to tequila crisis (1994) and the Asiatic one, is more devoted to explain crises in emerging economies. Here currency crises are linked with banking fragilities and imperfect information on financial markets. The so-called twin crises (see Kaminsky and Reinhart (1999)) are a characteristic feature of the crises of the eighties and of the nineties.

(2007) or Diwan (2001, 2002). 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.

2 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 mainly based on Dutt et al. (2008), who study the impact of trade on unemployment according to various theories. We propose a static version of the model, changing several assumptions in order to focus on the labour share and financial crisis. We design the model to describe what happens during a crisis in terms of factor reallocations across sectors and in terms of changes in the bargaining power of labour within sectors. Before starting with the presentation of the theoretical model we briefly describe how the macroeconomic aggregates behave during a crisis, since some of these will then have an impact on factor shares.

2.1 The macroeconomic background of the crisis

In this subsection we present some stylized facts coming mainly from Kaminsky and Reinhart (1999) and Kaminsky (2006) 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.

Kaminsky and Reinhart (1999) examine the evolution of several macroeconomic aggregates during currency crisis episodes and their period of financial turbulence is defined as the period going from 18 months before the crisis occurs to 18 months after.

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 (2002) or Kehoe and Ruhl (2009) for evidence.

Moreover, crisis episodes are generally associated with a decrease in the capital stock. Indeed, several indicators in Kaminsky and Reinhart (1999) suggest a decrease in the funds available to finance firms' investments. For example, the growth rate of bank deposits remains close to normal during the 18 months prior to a financial crisis, but the loss of deposits accelerates as the crisis unfolds, and deposits only starts

to recover a year and a half after the crisis. Furthermore, the annual growth of the domestic credit/GDP ratio decreases after the crisis occurs and 12 months after the crisis, is 5 percent below what it is during 'tranquil' periods. Kaminsky (2006) shows that currency crises are associated with losses of foreign exchange reserves, with a decrease of about -12% with respect to its level 6 months before the crisis. Finally, Kaminsky and Reinhart (1999) document that during crises episodes, annual "changes in stock prices (...) are about 40 percent below those observed in non-crisis period", which reflect capital flights among other things. Therefore there is evidence that financial crises are associated with massive capital flights.

Hutchison and Noy (2005), using panel data over the 1975-1997 period for 24 emerging-market economies, that currency crises reduce output by about 5 to 8 percent over a two to four year period. Kaminsky and Reinhart (1999) also document slow-downs in economic activity. To use their exact words: "For balance of payments crises, the 12-month growth in output bounces in a range of 2 to 6 percent below the comparable growth rates during tranquil periods-with a tendency for the recession to deepen as the crisis nears". Hence the cost of financial crisis in terms of economic activity is high for the economy as a whole⁶. The reasons why currency crises and more particularly crises associated with a reversal in capital flows cause severe recessions are summarized in Hutchison and Noy (2006). Reinhart and Calvo (2000) 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 (2001) 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 (2000)), making them reduce their loans which contribute to recession. As a result, investment and capital stock drop during a currency crisis.

A number of authors have pointed out that many currency crises result from a shock to world capital interest rates (see Calvo (1998) or Kaminsky (2006)). Frankel and Rose (1996) show that foreign interest rates play a significant role in predicting currency crashes. Kaminsky and Reinhart (1999) show that many of these crises are concentrated at the beginning of the 1980s and suggest that they could be due to the sharp increase in US interest rates during this period.

Another fact we want to highlight on is the pattern of unemployment and employment during crisis periods. As noted by Fallon and Lucas (2002) 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. Finally, currency crisis imply reallocation effects across sectors. Fallon and Lucas (2002) report an increase in self employment and employment changes across sectors suggesting reallocation effects. Tornell and Westermann (2002) show that in the aftermath of crisis, the tradable sector experiences an acceleration of growth after a mild recession, while the non-tradable sector experiences a sharp fall and a sluggish recuperation. In contrast, prior to a crisis the non tradable sector grows faster than the tradable sector. This suggests major reallocations of factors across those two

⁶Note that Kaminsky (2006) shows that currency crises associated with financial excess are more severe. Hutchison and Noy (2006) show that currency crisis classified as sudden stop crisis (60% of crisis in emerging economies), characterized by a reversal in capital flows, are much more severe as they reduce output growth by 8-11 percentage points in the year of the crisis.

sectors.

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

2.2 The basic model

2.2.1 Environment

We propose a static model designed to analyze the impacts of financial crises on the labour share. In this model, we take the crisis as exogenous and focus on the possible consequences for the labour share. As in Dutt et al. (2008) the model features two sectors with different factor intensities allowing for factor reallocation across sectors. In this model, the labour share can change due to a composition effect as factors reallocate during the crisis. We add to the model the exchange rate and the possibility for factors to reallocate across sectors. The model also exhibits matching frictions with shadow entry costs and rents on the good market. Wages are bargained over the surplus as in standard Pissarides (2000) framework. Those assumptions allow us to study movements in the labour share since workers are not paid at marginal product⁷, while frictions allow the model to be consistent with an increase in unemployment observed during financial turbulences. We also include a parameter d that captures the cost of crisis in term of debt repayment labelled in foreign currencies and we add outside options for capital I . The main idea is that although outside options of labour, as they are mainly local, shrink during a crisis, outside options of capital are determined at the world level and do not change as much. As a result, a currency crisis hurts labour in the wage setting and can negatively affect the labour share *within* each sector.

We first present and solve the model, then we turn to financial 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 the following:

$$Z = \frac{AX^{1-\alpha}Y^\alpha}{\alpha^\alpha(1-\alpha)^{1-\alpha}} \quad (1)$$

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

$$\frac{1}{A}(p_x)^{1-\alpha}(p_y)^\alpha = 1 \quad (2)$$

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 $X_d/Y_d = ((1-\alpha)/\alpha) p_y/p_x$. 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:

$$\left(\frac{X}{Y}\right)^d = f(p, e), \text{ with } f_p < 0 \text{ and } f_e > 0 \quad (3)$$

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 .

⁷If workers are paid at marginal product, labour share only depend on technological determinants.

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 world 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 . We assume that this entry cost is a shadow cost induced by product market regulation (see Blanchard and Giavazzi (2003)). 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. Capital costs and superprofits are part of value added and do not coincide with labor income. By contrast, entry costs cannot correspond to spendings 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.⁸

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

⁸We 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.

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

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

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

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 below, we will relax this assumption.

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

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

From (6), (10) and (12) we can find a solution for sectorial 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 .

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 $(1 - \phi_x)p_x A_x k_x^{\phi_x} = (1 - \phi_y)p_y A_y k_y^{\phi_y} = (1/2) \sum_s (1 - \phi_s)p_s A_s k_s^{\phi_s}$.

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. This is a reasonable assumption over the short and medium run, widely used to generate fluctuations of the unemployment rate over the business cycle in the matching literature (constant search costs)⁹. If we assume χ is proportional to the productivity over the long run and using previous assumption concerning parameters I and B , we can see that tightness and the unemployment rate do not depend on the productivity (peaceful period)¹⁰.

2.2.2 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 $LS_s = [\beta/(1 - (1 - \beta)b)] [(1 - \phi_s)(1 - i)]$.

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

⁹In a dynamic setting where wages are renegotiated in each period, the possibility for match destruction and state transition from an employed to an unemployed position imply that tightness (and unemployment) enter in worker outside option with positive sign. Hence, an increase in unemployment hurts labour in the wage setting process and decreases the labour share.

¹⁰As noted in Pissarides (2000), chapter 1, the flow income of an unemployed worker and the entry cost (search cost) must be proportional to productivity. If it were not the case, the unemployment rate would depend on output level over the long run, which is not a satisfying property of an equilibrium unemployment model.

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 ¹¹

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

2.3 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, b and d play a crucial role in the model to study the relative bargaining strengths during crisis.

2.3.1 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 .

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 $\phi_x < \phi_y$. $\square$

¹¹This parameter could be interpreted as the capital degree of mobility.

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 unambiguously raise the aggregate labour share.

Proposition 2. *The decrease in capital stock raises the weight of the labour intensive sector and reduces that of the capital intensive sector. This unambiguously increases the aggregate labour share.*

Proof. If $\phi_x > \phi_y$, then $k_x > k_y$. That is, sector X is capital intensive and sector Y is labour intensive. A decrease in capital stock makes the right hand side of (19) decreases. If ε does not decrease, the supply curve does not move and prices do not change. That is, from (14) and (15) k_x and k_y do not change and equality (19) does not hold. Hence, ε decreases making the relative supply of good X decreases. As p increases, k_x and k_y also decrease. The only possibility for equality (19) to hold is that k_x , k_y and ε decrease together. We can see that $\partial LS/\partial k = (\partial \varepsilon/\partial k)(\partial \pi/\partial \varepsilon)(\partial LS/\partial \pi) < 0$. The proof is similar in the case of $\phi_x < \phi_y$. $\square$

Therefore, the overall effect of the crisis 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 opposite direction. If $\phi_x < \phi_y$, that is if the tradable sector is labour intensive, both reallocation effects tend to increase the aggregate labour share.

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

2.3.2 Intrasectoral 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 in order to ensure the stability of sectoral labour shares over the long run. 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, $\partial LS_s/\partial p_s A_s k_s^{\phi_s} < 0$. As we saw in the previous subsection world outside options may increase during currency crisis. This corresponds to an increase in I and this makes the labour share decreases.

Other kinds of arguments could explain a decrease in the labour share following a crisis.

Many crises result in a credit boom as noted by Chang and Velasco (2001) or Kaminsky and Reinhart (1999). During those periods of financial excess, the loans were often made in dollars and firms (or Governments) were linked by contract with banks and lenders (see Jeanne (2003)). The exchange rate depreciation increases repayment charges and d become positive and increases. This reduces the surplus over which wages are bargained and, so do wages at given output. We can show that $\partial LS_s/\partial d < 0$.

Those effects disappear as soon as loans are repaid and new loans are contracted at the new exchange rate.

There is another mechanism driven by structural adjustment policies. During the 1980s and the 1990s, IMF interventions in response to financial crises generally required countries to implement the so-called structural adjustment plans. Adjustment programs consisted in reducing public spending. As a result there were often sharp cuts in welfare payments. The immediate impact in terms of our model is to decrease b . We can check that $\partial LS_s / \partial b > 0$. That is, the reduction in benefit payments that follows a crisis tends to reduce the labour share.

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, (ii) the increase in repayment charges labelled in foreign currencies d and (iii) the decrease in b resulting from IMF structural adjustment plans.*

Proof. (ii) and (iii) are 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. From proposition 2, we know that the decrease in aggregate capital stock lowers k_x , k_y and that the relative price p increases. 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 $\partial LS_s / \partial p_s A_s k_s^{\phi_s} < 0$. $\square$

We can summarize the previous findings in Table 1:

Table 1: summary of results					
parameters	crisis effect	$p_s A_s k_s^{\phi_s}$	LS_s	LS	u
K	—	—	—	—/+	+
e	+	?	0	—/+	?
i	+	0	—	—	—
b	—	0	—	—	—
d	+	0	—	—	+

The first column gives the various parameters that may change during a currency crisis. The second column describes how they change during the crisis. The other columns give the actual impact of the parameter change on each endogenous variable. A question mark means that we cannot sign the effect. For instance, the capital stock (K) collapses (—) during a sudden stop crisis, which implies a decrease in sector-specific labor shares (LS_s) and an ambiguous impact (—/+) on the aggregate labor share (LS)—depending on the magnitude of reallocation effects.

3 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, and to what extent is it due to a reallocation?

A first glance at the data suggests that currency crises reduce the labor share in a significant way. We divide the sample in subperiods lasting four years. In each subperiod, and for each country, we compute the percentage change in the aggregate labour share. Then, we compare the mean variation when a crisis occurs and when it does not. On the crisis subsample, the mean variation between one year before the crisis occurs and two years after is a 2.9 percentage point decrease. On the no-crisis subsample, the mean variation is a decrease by 0.11 percentage point. In the rest of this section, we show that the labor share recovers four years after the crisis occurs and that the observed decrease mainly corresponds to a within-sector fall.

3.1 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 which allows us to compare our results to those of Diwan (2001) and Diwan (2002).¹² 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.¹³ Index i stands for country. 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.¹⁴

We control for heterogeneity across countries thanks to country fixed effects. In our case, controlling for unobserved heterogeneity across countries is important since in developing countries the labour share tends to be lower than in developed ones (see Ortega and Rodriguez (2006)). If crises are more likely to occur in developing countries, a negative coefficient could capture only the fact that the labour share is negatively correlated to development. Diwan (2001) does not control for unobserved heterogeneity and this could be the reason why he finds a such high impact of the crisis (-10 points in some regressions).

¹²Comparability is however limited since Diwan works on UN data and does not use the same crisis criterion since he defines a crisis episode as a nominal annual exchange rate depreciation greater than 25%

¹³We control for factors accumulation and trade and financial openness

¹⁴We show in figure A-III that the 4-period lagged dummy is non significant.

Time dummies control for global shocks which could affect the labour share and which are not captured by the other explanatory variables, such as biased technological progress.

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

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

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 reallocation effects we perform estimations in differences. First of all we estimate an equation in differences at the aggregate level to appraise once again the overall impact of the currency crises on the labour share. 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 differences¹⁵(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:

¹⁵The operator Δ stands for the first order difference operator between t and $t - 1$.

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

Two terms appear.¹⁶ 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 $\phi_{i,t-1,s}$:

¹⁶In an alternative decomposition, a third terms appears

$$LS_t - LS_{t-1} = \underbrace{\sum_{s=1}^n (LS_{t,s} - LS_{t-1,s}^i) \phi_{t-1,s}}_{\text{within effect}} + \underbrace{\sum_{s=1}^n (\phi_{t,s} - \phi_{t-1,s}) LS_{t-1,s}}_{\text{net composition effect}} + \underbrace{\sum_{s=1}^n (LS_{t,s} - LS_{t-1,s}) (\phi_{t,s} - \phi_{t-1,s})}_{\text{interaction term}}$$

In this decomposition, the "within" term remains the same as in the previous one. The "composition" effect is here itself decomposed in two terms: the first can be named 'net composition effect' (the variation of sector shares weighted by the *initial* labour shares of each sectors), and the second one is an interaction term corresponding to the covariance of the variation of labour share and the variation of sector share.)

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

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:

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

3.2 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 (see appendix). 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.¹⁷ As argued by Gollin (2002) 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 (2002)). 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.

¹⁷See Appendix for a more precise definition of these variables.

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. 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.

A second problem of the UNIDO data is that the way in which the manufacturing sector is disaggregated 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.¹⁸

Data on currency crises come from Kaminsky (2006). The data comprises a panel dataset of 20 countries, 6 developed and 14 developing,¹⁹ which have experienced various currency crises in the sense of Kaminsky and Reinhart (1999) and Kaminsky (2006), over the 3 past decades. This sample is actually borrowed from Kaminsky (2006). As we discussed previously, we have chosen the currency crisis definition of Kaminsky and Reinhart (1999) because their criterion include reserve variations, which 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 (2006), 96 crises are identified. The 20 countries which form part of the sample have been selected by Kaminsky (2006) because they present characteristics which can allow her to apply the financial crisis criteria of Kaminsky and Reinhart (1999). 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 (2006) to define the database we work on.

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 (2006),²⁰ 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 either by our model or 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 (2006). Although Daudey and Decreuse (2006) empirically find a positive link between education and the labour share using the proportion of people attaining with tertiary education, we have chosen to use as a proxy of human capital the average number of years of formal schooling of

¹⁸We have also dropped the 34 observations where the labour shares were negative or greater than 100%.

¹⁹See appendix for the list of countries and how developing and developed are differentiated.

²⁰For instance, the UNIDO data set does not cover 1986 for Brazil which prevents us from including this country/year in our dataset.

adults over age 15 (see Barro and Lee (2000)). This variable is more appropriate in our case since 14 out of 20 countries of our sample are developing. Data on schooling are available every five year and yearly data are constructed by linear interpolation.

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 (1997), Harrison (2002), Jayadev (2007) and Ortega and Rodriguez (2002). Moreover, Kaminsky and Reinhart (1999) 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. Unfortunately, sectoral data on this variable are not available for developing 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 (2007),²¹ 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 (2007) in their "EWNII" dataset.

Lastly, our theoretical analysis indicates 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 (2008, 2009)). Unfortunately we have not been able to include a measure of institutional context due to the lack of data for developing countries.

Table 2: Descriptive Statistics

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 2 summarizes the data used in regressions: LS corresponds to the labor share, IY to our variable for capital acumulation (see appendix for details), School to our 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 labor share is 32.90%. This could seem very low. However, our data cover the manufacturing sector where the labor share is typically lower than in the rest of the economy. In addition, the wage bill does not include social contributions in the UNIDO dataset.

²¹See appendix for construction.

3.3 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. Moreover, the decline in the labour share often starts the periode before the crisis, with the decrease between $t - 1$ and $t + 2$ being of 2.9 points²². Since the largest variation takes place between $t - 1$ and $t + 2$, we will focus on this time period in the following descriptive statistics.

Figure 1 depicts the distribution of the variations of the aggregate labour share between $t - 1$ and $t + 2$, given that the crisis has occurred at t , for each country-year crisis episode. We can observe that about 72% of the country-year crises are marked by a decrease in the aggregate labour share.

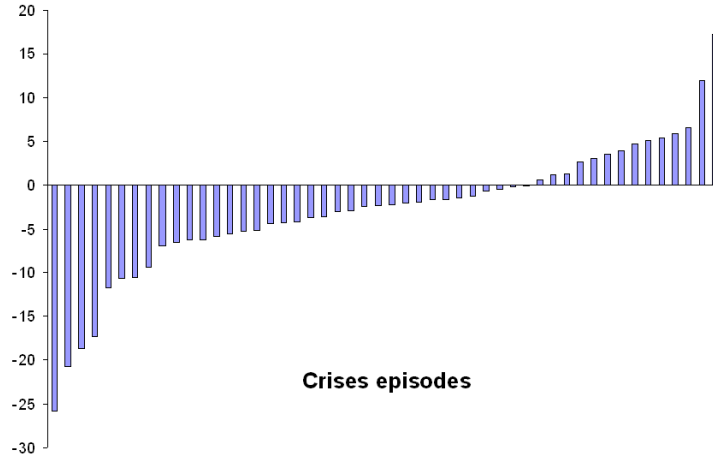


Figure 1: Variations of the labour share between $t - 1$ and $t + 2$, crisis in t

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. Note that in our theoretical model those differences are due to different technologies across sectors, but other factors could also explain such differences, for example different union bargaining power. Figure 2 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 2 shows that the labour share varies across sectors.²³ It is particularly large in sector 324 (footwear) and almost 20 points below average in sector 353 (petroleum).

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

²²The decrease is of about 2.4 percentage points between $t - 1$ and $t + 1$ compared to 1.9 between t and $t + 1$ indicating that the labour share starts to fall before the crisis occurs.

²³Numbers at the top of the bars represent standard errors.

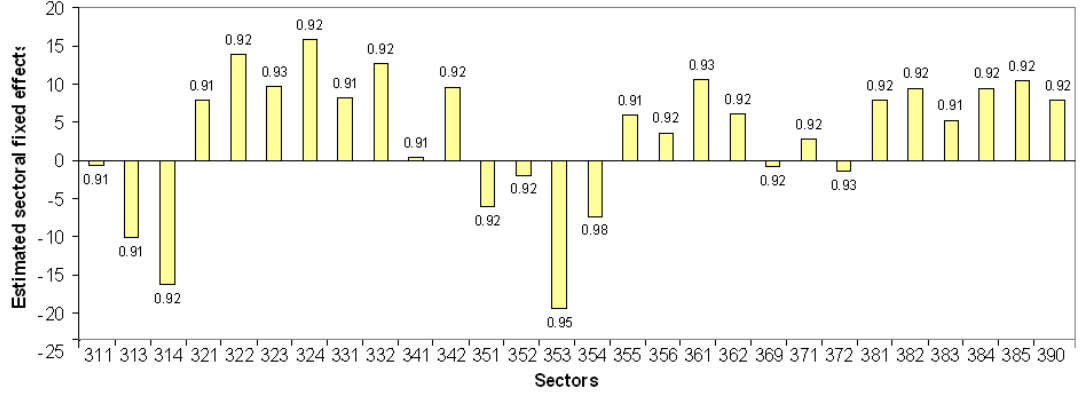


Figure 2: Estimated sectoral fixed effect

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. Figure 3 plots the distribution of the "within" term of the decomposition for each country/year episode. Figure 4 depicts the distribution of the "composition" term for each crisis. Figure 1 and 3 indicate that 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. As to the distribution of the between effect (composition effect) we can observe that it is clearly less important, see figure 4.

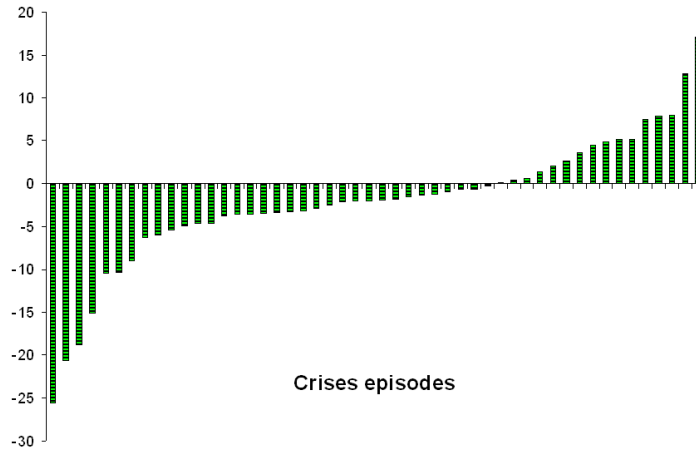


Figure 3: Distribution of the within term between $t - 1$ and $t + 2$



Figure 4: Distribution of the between term between $t-1$ and $t+2$

Finally, we plot in figure 5 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 5 suggests that most of the observed variations of the labour share are within sectors variations.

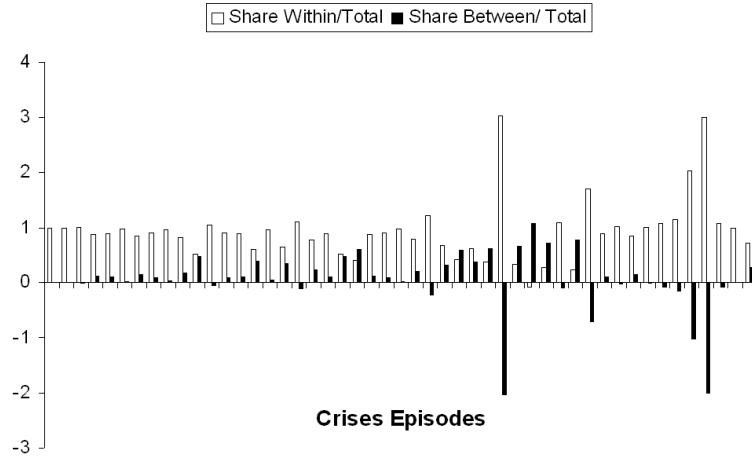


Figure 5: Shares of the within and the between term in the total variation of the LS

3.4 Econometric Analysis

3.4.1 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 identical if we introduce them at date $t - 1$, as treatment for endogeneity. Results are reported in table 3. 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 (2006). 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 added²⁴.

Table 3: Aggregate Data- Core Regressions-All countries

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

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

We next turn to estimations on sectoral data (ie, 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 4. 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. The 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 (see table A-III in Appendix).

²⁴For example, the coefficient of $Crisis_{t-1}$ increases of about 0.25 points.

Table 4: Sectoral 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

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.²⁵ One possible interpretation of the fact that this variable is not significant at the aggregate level, and very significant and of a quite high magnitude (positive) at the sectoral level would be that technology is CES within sectors, with an elasticity of substitution lower than one, but that the aggregate technology turns to be Cobb Douglas when we aggregate sectors ; see Jones (2003)²⁶. 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 (2002) and Jayadev (2007)). 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

²⁵This is in line with Hamermesh (1996) who shows that most of the studies he surveys find that labour and capital are complements.

²⁶Jones (2003) proposes a production function which reconciles the following stylized facts : long run growth, non constant labour shares, capital augmenting technological change and capital-labour complementarity. His production function is a "mix" of a CES production function where capital and labour are complement and a Cobb Douglas one, where the CES term becomes equal to one in the long run in such a way that the production function evolves into a Cobb Douglas. It is possible to interpret this production function as an aggregation of CES functions at the sectoral level that results in a Cobb-Douglas at the aggregate level.

expected, trade openness has a significant negative impact on the labour share, in line with Ortega and Rodriguez (2002).

Next we consider whether results differ for developing and developed countries since developing countries are more prone to currency crises and are characterized by lower labour shares (see Ortega and Rodriguez (2006)). We use the classification of the World Bank²⁷ 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 5.

Table 5: Core Regressions-All countries-Developed Countries-Developing Countries

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

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

²⁷In the sample, four countries are developed countries, and sixteen are developing, see appendix.

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 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. Concerning control variables, the impact of capital intensity is positive and significant for both countries but much more important for developed ones : in developed countries the coefficient lies between 19.2 and 18.1 points depending on what control of financial openness we use, whereas in the developing ones it is about 2.3 points. 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.

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

3.4.2 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 analysis that financial crises may lead to changes in the sectoral composition of the economy. Our first look at the data in figures 3, 4 and 5 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 3.1.²⁸ Results are reported in table 6 for developed countries and in table 7 for developing countries.

²⁸We 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

Table 6: Regressions in Differences - Developed Countries

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

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 column 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 decline²⁹. 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 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.³⁰

²⁹Notice 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.

³⁰In the appendix we show 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 (n°369, 'Other non-metallic mineral products') exhibits a significant and positive impact of the crisis on the labour share

Table 7: Regressions in Differences - Developing Countries (DC)

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)
<i>Crisis_t</i>	-2.24*** (0.79)	-1.83*** (0.67)	-0.40 (0.30)	-0.14*** (0.04)	-0.01 (0.01)	-2.01*** (0.39)
<i>Crisis_{t-1}</i>	-0.30 (0.78)	-0.18 (0.68)	-0.12 (0.33)	-0.02 (0.03)	-0.01 (0.01)	-0.25 (0.37)
<i>Crisis_{t-2}</i>	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

3.4.3 Accounting for endogeneity and autocorrelation

In this sub-section, we check the robustness of the relationship between currency crises and the labor 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 labor 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 labor 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 labor share may directly affect the probability a crisis occur for reasons that are outside our model. For example, a low labor share may attract capital inflows, as wages to productivity are low, and increase the probability of a crisis occurring. A high labor share may also lead to a crisis because it reduces investors' returns. If the past labor 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.

Autocorrelation is a serious problem with panel data when the explained variable does not vary much over time. Tables 3, 4 and 5 account for heteroskedasticity, but not for autocorrelation. Dealing with autocorrelation requires us to add the lagged labor share to the set of regressors. However, the fixed-effect estimator is biased in finite samples because the residuals are correlated with the new regressor (see Nickell (1981)). The size of the bias is typically magnified in small-T-large-N panel datasets such as ours. Note that including the lagged labor share among the regressors may help to deal with the

causality/endogeneity issue discussed above as the past labor share may be correlated with the probability of a crisis occurring.

To address these two sources of bias, we use the system-GMM estimator due to Blundell and Bond (1998). This estimator proves to be more stable vis-à-vis sample and instrument alterations than the Arellano and Bond (1991) difference estimator (we nevertheless also perform a Arellano and Bond estimation as a robustness check). Formally, the model is written as follows:

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

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 labor share is instrumented by past levels of the labor share (starting with LS_{ist-2} , not correlated with $\Delta \varepsilon_{ist} = \varepsilon_{ist} - \varepsilon_{ist-1}$), while the lagged labor share is instrumented by past differences of the labor share in the level submodel (starting with ΔLS_{ist-1}). This generates a large number of instruments in GMM-style. The set of instruments is finally reduced by collapsing the matrix of GMM-style instruments³¹. Note that according to Roodman (2006), the collection set of instrument may be large but should not outnumber individuals (country*sector) in the panel. For each regression, we report number of individuals and number of instrument and show that in most of the cases we remain far from the limit³².

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 (2005) correction. This method corrects for individual heteroskedasticity, arbitrary patterns of autocorrelation within individuals, and downward squared-error bias in finite sample³³.

We proceed in several steps. We mainly focus on developing countries as they experience sharp decreases in the labor share following a currency crisis. The results are remarkably consistent across the various system-GMM estimations we perform. Parameter a^1 is about 0.50, which is lower than a unit root, but sufficiently high to prefer the system-GMM estimator³⁴ rather than the difference estimator. Table 8 displays results.

In column *a*, we first consider the crisis variable as exogenous whereas all other variables are treated

³¹The number of instruments increases with the time index of each observation. The total number of instruments is quadratic in the number of periods as a result. Collapsing allows such a number to be reduced, while exploiting the same information displayed by the dataset (see Roodman (2006)).

³²Too many instruments can bias the over-identification test, generating implausibly good P-values of 1.000 (Bowsher (2002)). It could also bias coefficients. But Windmeijer (2005)'s finding arguably indicates that the limit is generous.

³³Results are very closed in one-step GMM

³⁴if the labor share follows a random walk, its own past value are poorly correlated with current variations. As a result the difference GMM-estimator performs badly and the system GMM estimator is preferred.

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). Coefficients associated with crisis dummies are very significant. The labor share is 2 points lower the year the crisis occurs, 1.10 points lower one year later and 0.80 point lower two years later. This is consistent with findings of Hutchison and Noy (2006) who find that currency crises and more particularly crises associated with sudden stops have an impact on growth until two or three years after the crisis occurs. Specification tests like the Hansen tests of over-identifying restrictions, and the Arellano and Bond (1991) test (AB test) of second-order autocorrelation have to be performed routinely when using GMM-estimation of panel dynamic models. 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 $\Delta\varepsilon_{t-2}$ are correlated by construction). As a result, labor share in $t - 2$ is a valid instrument for labor share in $t - 1$. The Hansen test verifies that moment conditions approach zero (that is, instruments are orthogonal to residuals). Here we can reject the null hypothesis of exogeneity suggesting specification problem due to invalid instruments (correlated both with crisis and the labor share).

In column *b* we choose to limit the number of lags to instrument the labor share to 10. Indeed, very old patterns of the labor 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. The AB test still has a very high P-value and the Hansen test has a P-value of 0.33 suggesting that instruments are exogenous. Coefficients remain very stable.

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 ($\varepsilon_t - \varepsilon_{t-1}$). Only the coefficient associated with crisis in t is affected and is reduced by 25% with respect to previous estimations. 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. We deal with this issue through two different methods.

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 labor 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.³⁵ The reason we add such external instruments is the following. Past values of crisis variables may be poorly related to present values due to the fact that crisis is a particular event.³⁶ Adding instruments orthogonal to the errors terms should help to set moment condition equal to zero when minimizing the GMM objective function with respect to estimated coefficients. Coefficients are very similar to previous one and P-value of the Hansen test rise to 0.19 suggesting that extra external instruments are good one.

³⁵The relevancy of those instruments to explain currency crises is well explained in Kaminsky and Reinhart (1999), Kaminsky (2006) or Frankel and Rose (1996).

³⁶The consequence of instruments with little explanatory power is increased bias in estimated IV coefficients (Hahn and Hausman (2002)). This is the problem of weak instruments.

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 labor share in t , and this is probably so because crises have long lasting effect. In regressions of Tables 2 and 3, the labor 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 $t - 2$. Coefficients are marginally affected. Both the AB test and the Hansen test feature high P-values. This suggests that we can consider with a quite important degree of confidence that instrument are valid, that is, not correlated to errors and that results are unbiased.

In column *f*, we run the regression specification of column *e* using the simplest unstable estimator of Arellano and Bond (1991). This estimator is also called the Difference-GMM estimator as coefficients are estimated only using the model in difference, where differences of the labor share are instrumented by levels. Results remain very similar.

For developed countries we use the specification of column *d*.³⁷ 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 (1998) estimator. For developed countries, the decrease in labor share occurs one year after the crisis. The decrease is about 2.90 points and there is no negative impact in t and $t + 2$. The Hansen test is satisfied with a high P-value (0.25) suggesting the validity of our specification in instrumenting regressors. 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 labor share and of the regressors are invalid instruments as they are correlated with both regressors and labor share in t .

In column *h*, we instrument the labor share in $t - 1$ (in difference) with the labor share in $t - 4$, other regressors in t , $t - 1$, $t - 2$ with their value in $t - 4$. Results does not change so much. The decrease in labor share is about 2.80 points. As expected, the P-value of the Hansen test increases sharply to reach 0.437 suggesting that, according to the AR test at the 2nd and 3rd order, $t - 2$ and $t - 3$ value of regressors are invalid instruments. The high value of parameter a^1 (0.70) suggests that the Arellano and Bond (1991) estimator in difference should not perform very well for developed countries.

At the end of the day, the use of GMM methods confirms the results formerly obtained by standard fixed effects estimations. The magnitude of the coefficients associated with crisis episodes is marginally affected. For developing countries, the estimated decrease is larger at the time of the crisis and the labor share recovers more rapidly. For developed countries, the coefficient is 30% higher than former estimates but the dynamic of the labor share following the crisis remains essentially the same. If previous estimates suffer from endogeneity problems and dynamic misspecification, this marginally affects estimated coefficients and the message does not change: the labor share sharply decreases during a currency crisis.

³⁷We 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.

Table 8: System GMM estimations

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

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

3.4.4 One size fits all?

Whereas the theoretical literature on financial crisis has made a clear distinction between the different kinds of currency crisis, the empirical one does not and uses the same variable for all crisis episodes. A first and noteworthy attempt has been made by Kaminsky (2006) who distinguishes between 6 kinds of crises among the sample of countries which have experienced currency crises.³⁸ Here we take her classification and run our core regressions on each kind of crisis.

Kaminsky (2006) identifies several indicators and uses them to classify crises. The first group corresponds to first-generation models (Krugman (1979)) where crises are characterized by fiscal deficits (FD). The second group corresponds to second-generation models (Obstfeld (1996)) where crises are characterized by real exchange rate appreciation creating current account problems (CA), which make the currency vulnerable to speculative attack. The main characteristics of the third-generation model (see for example Chang and Velasco (2001)) are booms in financial markets. We put into this group crises associated with financial excess (FE). Sudden stop crises (SS) constitute the fourth group and are characterized by an external shock to the world interest rate (this criterion is much more restrictive than Hutchison and Noy (2006)'s definition) . The fifth group identified by Kaminsky corresponds to sovereign debt crises (SD) and is characterized by unsustainable foreign debt (level and maturities). Finally when crises are associated with no fragility, crises are labeled self-fulfilling crisis (SF). Kaminsky (2006) shows that crises associated with financial excess, fiscal deficit or sovereign debt problem are more located in emerging economies whereas sudden stop crises or self fulfilling ones occur more often in mature economies.

The basic regressions in levels described in equation (21) are run for each group of crisis and are reported in Table 9. Three groups of crises emerge. First of all, we can see that crises associated with current account problems (CA), fiscal deficits (FD), and sudden stop crises (SS) have a negative impact on the labour share. First-generation crises (FD) are particularly detrimental. Indeed, the year in which the (FD) crisis happens, the labour share falls by 7.7 points, one year after that the labour share still decreases and its level is 10.3 points lower than it would have been if the crisis had not occurred. Two years after, the labour share starts to increase without totally recovering, and reaches a level of about 8.2 points lower than its 'normal' one. The decrease is more moderate, although of quite high magnitude, for current account crises and sudden stop crises. For example, three years after the CA crisis, the labour share is still 3.1 points lower than its level if the crisis had not happened, and 4.1 points lower three years after SS crises.

Sovereign debt crises (SD) raise the labour share the year they take place, by about 1.7 points, but the labour share then declines. Surprisingly, the significant correlations between self fulfilling crises (SF) and the labour share are always positive. Finally, financial excess crises (FE) have a mitigated impact on factor income distribution since the labour share decreases the year they happen, but increases of almost the same amount the next year.

³⁸sample which is actually the one we used to define our panel dataset in the previous section

Table 9: One size fits all?

Specification	CA	FD	SS	SD	SF	FE
Crisis _t	0.95 (1.74)	-7.81*** (0.96)	-2.83** (1.12)	1.68** (0.68)	-0.19 (1.23)	-1.40* (0.82)
Crisis _{t-1}	-2.48*** (0.88)	-10.26*** (1.15)	-3.98*** (0.97)	-1.19* (0.69)	-1.49 (1.20)	1.17* (0.71)
Crisis _{t-2}	-2.96*** (0.81)	-8.19*** (1.36)	-3.68*** (0.84)	-1.01 (0.69)	2.88* (1.55)	1.07* (0.65)
Crisis _{t-3}	-3.10*** (0.67)	-6.60*** (1.51)	-4.14*** (0.92)	-1.32 (0.85)	2.89** (1.30)	0.65 (0.70)
IY	4.22*** (1.04)	7.04*** (0.93)	4.68*** (1.03)	4.43*** (1.03)	4.66*** (1.04)	4.76*** (1.02)
school	2.72*** (0.43)	2.35*** (0.41)	2.98*** (0.42)	2.56*** (0.42)	2.78*** (0.43)	2.76*** (0.43)
OPENK (de jure)	-0.38* (0.23)	-0.44** (0.21)	-0.36 (0.23)	-0.37 (0.23)	-0.33 (0.23)	-0.38 (0.24)
OPENT	-0.12*** (0.02)	-0.14*** (0.02)	-0.12*** (0.02)	-0.11*** (0.02)	-0.12*** (0.02)	-0.11*** (0.02)
Fraction of all crises	12.50%	6.25%	8.33%	35.42%	8.33%	29.17%
Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.86	0.87	0.86	0.86	0.86	0.86
Nb of Observations	8936	8936	8936	8936	8936	8936

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

4 Conclusion

In this paper we investigate the relationship between currency crises and the labour share. We develop a theoretical model and perform estimations on manufacturing sectoral data to discriminate between two explanations: within-sector changes induced by modifications in the relative bargaining power of workers, and composition effects induced by factor reallocations across sectors.

In the theoretical part we build a two-sector model, one sector producing a tradable good and the other a non-tradable good. The two sectors differ in factor intensities. We assume the existence of shadow entry costs in the goods market and search frictions in the labour market so wages depart from the marginal product of labour, implying that wage changes may affect the labour share. The model predicts two reallocation effects which can move in opposite directions. The first one is that exchange rate depreciation increases foreign demand for the tradable good so that the relative price of the tradable good goes up and factors flow in the tradable sector. Then, if the tradable sector is more capital (labour) intensive than the non-tradable one, the aggregate labour share decreases (increases). The second reallocation effect is that capital outflows -which are characteristic of financial crises- imply factor reallocations from the capital intensive to the labour intensive sector, which leads to an increase in the aggregate labour share. The model also illustrates a within sector effect : during wage bargaining, currency crises benefit to the most mobile factor which is capital 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.

In the second part of the paper we turn to the data to examine the relationship between currency crises and the labour share. 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 overall labour share in manufacturing is due to within-sector effects. This conclusion is in line with Diwan’s 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. Finally, we show that this decrease hides large disparities across the different types of crises. Indeed some have a stronger impact than others, the most damaging ones for the labour share being those associated with fiscal deficits, whereas others actually lead to an increase in the labour share (as self fulfilling crises). These results imply that more complex mechanisms are at work and that we should further investigate the ties between currency crises and the labour share. One limit of this analysis is that we have data only on manufacturing. Results using data on the whole economy could make reallocation effects in favour of the capital share appear.

5 Appendix

5.1 Data

5.1.1 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.

5.1.2 List of countries

We use the classification of the World Bank to separate countries according to their level of development. The criterion is the Gross National Income per capita. There are 4 developed countries which are the high income ones, and 16 developing countries which are the lower middle income and upper middle income ones.

Table A-I: List of countries

Countries	Income class
Argentina	Upper middle income
Bolivia	Lower middle income
Brazil	Upper middle income
Chile	Upper middle income
Colombia	Lower middle income
Denmark	High income
Finland	High income
Indonesia	Lower middle income
Israel	High income
Malaysia	Upper middle income
Mexico	Upper middle income
Norway	High income
Peru	Lower middle income
Philippines	Lower middle income
Spain	High income
Sweden	High income
Thailand	Lower middle income
Turkey	Upper middle income
Uruguay	Upper middle income
Venezuela	Upper middle income

5.1.3 List of manufacturing sectors

5.2 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.

$$\begin{aligned}
LS_{its} = & a_i + a_t + a_s + \beta_1 CRISIS_{it} + \beta_2 CRISIS_{it-1} + \beta_3 CRISIS_{it-2} + \beta_4 CRISIS_{it-3} + \beta_5 CRISIS_{it-4} \\
& + \gamma_1 I/Y_{its} + \gamma_2 SCHOOL_{it} + \gamma_3 OPENK_{it} + \gamma_4 OPENT_{it} + \varepsilon_{its}
\end{aligned} \tag{31}$$

5.3 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.

Table A-II: Sub Sectors

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

Table A-III: Core Regressions-All countries

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-IV: Regressions within each sector

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

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

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