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LOW INCOME COUNTRIES, CREDIT RATIONING AND DEBT RELIEF: BYE BYE INTERNATIONAL FINANCIAL MARKET?¹

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Abstract

Low Income Countries (LICs) have a very limited access to international financial markets. Since the 90's, LICs have been granted debt relief by bilateral creditors and by international financial institutions. Did those debt relief initiatives send a negative message to the lenders, deterring them to lend to the LICs? For assessing this we use a new extended concessionality rate of financing flows. We assess the impact of debt relief on this concessionality rate implementing a Granger causality test using panel data, a methodology perfected by Hurlin (2004, 2005), Hurlin and Venet (2004) and Dumitrescu and Hurlin (2012). We show that for the 28 LICs of our panel, there is a robust causal relationship from debt relief to the concessionality rate of financing flows (either positive or negative). The reverse causality is also significant, but to a lesser extent.

Key words: Debt relief, Low Income countries, Causality in panels, Access to the financial market, concessionality.

Résumé

Les pays à faible revenu (PFR) ont un accès très limité au marché financier international. Depuis la fin des années 90, la plupart des PFR ont bénéficié de réductions de dette de la part de leurs créanciers bilatéraux et multilatéraux. Ces réductions de dette ont-elles envoyé un signal négatif aux prêteurs, qui les auraient détournés de prêter à ces pays, ou, au contraire, un message positif d'accroissement de la capacité à rembourser ? Pour analyser ceci, nous utilisons un nouveau taux de concessionnalité élargi, et une nouvelle base de données sur les réductions de dette en termes d'encours. Nous effectuons un test de Granger en panel, une méthode mise au point par Hurlin (2004, 2005), Hurlin et Venet (2004) et Dumitrescu et Hurlin (2012). Nous montrons que pour les 28 PFR de notre panel, les réductions de dette ont un impact significatif (positif ou négatif) sur le taux de concessionnalité élargie. La causalité inverse est aussi significative, mais dans une moindre mesure.

Mots Clés : Réduction de dette, Pays à faible revenu, causalité en panel, accès au marché financier, concessionnalité.

JEL Code: C23, F34, 016

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1 Introduction

Since the end of the eighties, LICs have been granted debt relief by bilateral creditors and by international financing institutions. Did those debt relief initiatives send a negative message to the international investors, deterring them to lend to the LICs? On the one hand, debt relief is not likely to enhance trust, but on the other hand debt relief is creating some fiscal space, improving debt sustainability. As a result, more and more LICs have been able before the crisis to issue bonds on the international financial markets. This issue is different from the issue of the impact of default on future lending: in our case, we focus on the agreement given by creditors not to repay the debt.

For assessing the impact of debt relief on the ability to borrow from international financial markets and from public creditors, we will i) use a new metrics of concessionality of financing flows and ii) assess the impact of debt relief on this measurement using a panel Granger causality test, as suggested by Hurlin (2004, 2005) and Hurlin and Venet (2004) and Dumitrescu and Hurlin (2012).

The remaining of this paper is organized as follows. Section 2 provides a brief background for the financing of LICs and for the impacts of debt relief. Section 3 presents the econometric methodology. Data and measurement of the concessionality rate are presented in section 4. Section 5 presents the results. Then we conclude in section 6.

2 LICs' financing and the impact of debt relief

Middle income countries (MICs) are able to borrow from international financial markets but not in their own currency, and from their own financial domestic market, but only short term. This peculiarity of emerging economies has been coined “original sin” by Eichengreen et alii (2003) because this cannot be explained by “fundamentals” of these economies. This constraint has been somehow relaxed since 2003, as some emerging countries have been able to borrow from international investors in their own currency, and from their own domestic market for longer periods.

LICs are different. We propose to characterize their (non)access to the international financial market as a “double original sin”, because they cannot borrow from international sources even in hard currency terms at market conditions. Exceptions were rather seldom in the nineties, but this double original sin did not prevail in the 70s, before the 1982 debt crisis.

From the beginning of the 80s, LICs rely on public institutions, like development banks to provide them with concessional loans. This institutional setting was put in place at the beginning of the sixties, after the independences of African States. At the World Bank for instance, a special subsidiary, the International Development Association (IDA) was created in 1960 in order to provide concessional lending to LICs defined as countries with less than 1,165 US\$ GDP per capita (IDA's fiscal year 2011). Concessional lending means loans that are “significantly” under the market rate. According to OECD DAC, this is the case when the present value of the loan, discounted at 10 percent, is less than 75 percent of the face value of the loan. The rationale behind this institutional setting is somehow puzzling, because economic theory assumes that

returns on investment should be much higher in LICs, and so private capital should flow from rich to poor countries (“Lucas Paradox”).

The wording “double original sin” is relevant because, as in the case of “original sin” for emerging countries, there is no rationality behind this behaviour of financial markets. Even if LICs are well managed, they still cannot access the market. In the case of the original sin, Eichengreen et alii (2003) have shown that the only variable that explains the market access is the size of the economy (GDP in US dollars). In the case of LICs, Gelos and alii (2004) tried to find out empirically the determinants of the ability to issue bonds on the international financial markets, but find few, except GDP again, and to a lesser extent, the share of agriculture in the GDP. This second indicator is pretty well correlated with GDP per capita. They have also shown that previous default do not explain LIC’s access to the financial market. Raffinot (2008) has shown that the main determinant of the concessionality rate of loans to LICs is the GDP per capita, and that the inclusion in the HIPC initiative was also significant for explaining the concessionality rate of new lending.

Debt relief begun with small bilateral debt relief. It was then made systematic for bilateral lenders of the Paris Club under the Toronto Treatment (1988), and the scope of debt relief has been widened up to 90 - 100 percent (Cologne treatment, 1999). The multilateral debt was not to be cancelled since 1996, it was considered senior, and could never be cancelled or even rescheduled. From 1996 on, under the Highly Indebted Poor Countries (HIPC) Initiative and from 2005 on under the Multilateral Debt Relief Initiative (MDRI) quite all the multilateral debt stock of HIPC countries has been cancelled (IMF, World Bank, African Development Bank and Inter-American

Development Bank). The MDRI cancelled quite all the remaining debt stock of LICs that already reached the "completion point" of the HIPC initiative. It would have seem consistent to stop lending to LICs, and to provide them only with grants. In this sense, the Bush administration insisted that the International Development Association (IDA, a part of the World Bank group in charge of financing LICs) should only provide grants. The result is mixed: IDA still provides concessional lending (as the IMF does), but also grants.

From the standpoint of international private investors, debt relief may be seen either as a negative signal (incapacity to repay the former debt) or as a positive signal (recovery of a capacity to repay). The final result will depend on the characteristics of the investors, namely their memory of past defaults and losses, but also their ability to assess the risks in a context that always seems different from the past (the "This time is different" syndrome analysed in details by Reinhart and Rogoff 2009).

Public lenders and donors do not have the same objectives and constraints. They are supposed to achieve at the same time various objectives: providing resources for development (disbursing their budget), being profitable or at least financially sustainable and promoting economic liberalisation (See Mosley et alii, 1995 for analysing the World Bank in this way). They also face different constraints: they borrow on the international financial market (and so they have to protect their rating), but for LICs financing they rely heavily on subsidies. These specificities may explain why public lenders react in a different way. For instance, countries like Burkina Faso and Mali have been repaying all their debt since 1994. They have been granted debt relief by Multilateral institutions, which sounds surprising.

One more issue has to be taken into account: the free rider behaviour. If a specific lender, or a specific group of lenders (as Paris Club Members) provides debt relief, this may be an opportunity for non-cooperative lenders to enter the scene. China and to a lesser extent Brazil, India and other emerging economies may be seen as behaving this way. For instance, IMF did postpone debt relief to Democratic Republic of Congo (DRC) because it was considering borrowing large amounts from China, with special arrangements for in-kind repayments. Bretton Woods Institutions tried to protect themselves from this threat by imposing to their borrowers not to borrow at the same time at non concessional terms.

From a theoretical point of view, the impact of debt relief has been debated. Debt relief is widely considered as having a positive effects on the benefiting economy, namely because it creates fiscal space. Not repaying the debt any more may result in more public expenditure - and, as conditions have been attached to debt relief under HIPC initiative, to better quality public expenditure. Of course, this does not hold for countries who were not actually repaying their debt service in full before the HIPC initiative.

Moreover, a large economic literature stressed the idea that high levels of debt may result in a debt overhang, lowering investment and growth (See a survey in Obsfeld and Rogoff 1996). According to this view (often labelled Debt Laffer Curve), debt relief should boost investment and growth. This was the rationale behind the HIPC initiative (but not behind the MDRI, because in this case all the debt stock has been cancelled, not only what was considered as over indebtedness). However, to our knowledge, there is no convincing empirical evidence showing the existence of a debt overhang for LICs

(Idlemouden and Raffinot 2005).

At the opposite, some potential adverse effects have been pointed out, as the possibility that debt relief will result in moral hazard, casting some doubt on future repayments. Moreover, it has been shown that public aid to developing countries sometimes results in lower savings and lower tax ratios. The same might be true for debt relief, which is a special kind of grant. However, these concerns may have been overstated, as shown by Cassimon & Van Campenhout (2008).

So the impact of debt relief on financing flows is difficult to predict. Some concerns have been formulated that debt relief would make it impossible to resume borrowing. If true, debt relief would have been a mixed blessing, as it seems impossible for a country to develop (not to say emerge) with foreign financing only made of grants.

Surprisingly, after debt relief but before the present crisis, some LICs have been able to borrow, not only from public institutions, but even from the private international financial market. Moreover, because of the low interest rates in OECD countries, LICs were considered by private international investors as interesting potential borrowers (See *The Economist*, « 24 International Sovereign Bond Hunters On Safari In Africa », 24/12/07). Kenya, Tanzania and Zambia have been considering issuing bonds on the international financial market. Ghana did it, issuing 750 million USD Eurobonds (10 years, 8.5 percent, rated B+ by Fitch). M. Baah-Wiredu, minister of Finances, stated that this issue: "... came as the next logical step after the completion of the HIPC Programme and the Poverty Reduction Growth Facility Programme with the IMF which classified Ghana as a matured stabilizer." (*Accra Mail*, 12/10/2007).

This paper focuses on the impact of debt relief on the concessionality of borrowing.

We will test this impact on 37 LICs.

3 Econometric methodology

We use a methodology which was perfected by Hurlin (2004, 2005), Hurlin and Venet (2004) and Dumitrescu and Hurlin (2012). Let us consider two covariance stationary variables, denoted x and y , observed on T periods and on N countries. For each individual $i = 1, \dots, N$, at time $t = 1, \dots, T$, we consider the following heterogeneous autoregressive model:

$$y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (1)$$

with $\beta_i = (\beta_i^{(1)}, \dots, \beta_i^{(K)})'$. Individual effects α_i are assumed to be fixed. We assume that the lag-order K is common, but we will propose a sensitivity analysis on this parameter. We prefer this approach rather than using some criteria information for each individual equation with a small sample T . The autoregressive parameters $\gamma_i^{(k)}$ and the regression coefficients slopes $\beta_i^{(k)}$ differ across countries. However, contrary to Weinhold (1996) or Nair-Reichert and Weinhold (2001), parameters $\gamma_i^{(k)}$ and $\beta_i^{(k)}$ are constant. It is important to note that our model is not a random coefficient model as in Swamy (1970): it is a fixed coefficients model with fixed individual effects. For each cross section unit $i = 1, \dots, N$, individual residuals $\varepsilon_{i,t}$, $\forall t = 1, \dots, T$ are *i.i.d.* $(0, \sigma_{\varepsilon,i}^2)$ and are independently distributed across groups. As we will see later, this cross-sectional independence assumption is crucial for the asymptotics of our test.

In this heterogeneous panel model, we propose to test the Homogenous Non Causal-

ity (HNC) hypothesis.

$$H_0 : \beta_i = 0 \quad \forall i = 1, \dots, N \quad (2)$$

with $\beta_i = (\beta_i^{(1)}, \dots, \beta_i^{(K)})'$. Under the alternative hypothesis, there is a causality relationship from x to y for at least one cross-section unit. We also allow for some, but not all, of the individual vectors to be equal to 0. We assume that there are $N_1 < N$ individual processes with no causality from x to y .

$$H_1 : \quad \beta_i = 0 \quad \forall i = 1, \dots, N_1 \quad (3)$$

$$\beta_i \neq 0 \quad \forall i = N_1 + 1, N_1 + 2, \dots, N$$

where N_1 is unknown but satisfies the condition $0 \leq N_1/N < 1$. The structure of the test is similar to the unit root test in heterogeneous panels proposed by Im, Pesaran and Shin (2003). In our context, if the null is accepted the variable x does not Granger cause the variable y for all the countries of the panel. On the contrary, let us assume that the HNC is rejected and if $N_1 = 0$, we have seen that x Granger causes y for all the countries of the panel: in this case we get an homogenous result as far as causality is concerned. The DGP may be not homogenous, but the causality relations are observed for all countries. On the contrary, if $N_1 > 0$, then the causality relationships is heterogeneous: the DGP and the causality relationships are different according the countries of the sample.

In Hurlin (2004), we propose to use the average of individual Wald statistics associated to the test of the non causality hypothesis for units $i = 1, \dots, N$. Let $W_{N,T}^{Hnc}$ be

this average statistic.

$$W_{N,T}^{Hnc} = \frac{1}{N} \sum_{i=1}^N W_{i,T} \quad (4)$$

where $W_{i,T}$ denotes the individual Wald statistics for the i^{th} cross section unit associated to the individual test $H_0 : \beta_i = 0$. In order to derive the asymptotic distribution of $W_{N,T}^{Hnc}$ under the null hypothesis of non causality, we consider the case of a sequential convergence when T tends to infinity and then N tends to infinity. This sequential convergence result can be deduced from the standard convergence result of the individual Wald statistic $W_{i,T}$ in a large T sample. Under the null hypothesis of non causality, each individual Wald statistic converges to a chi-squared distribution with K degrees of freedom:

$$W_{i,T} \xrightarrow[T \rightarrow \infty]{d} \chi^2(K) \quad \forall i = 1, \dots, N \quad (5)$$

So, when T tends to infinity, individual statistics $\{W_{i,T}\}_{i=1}^N$ are identically distributed. They are also independent since the residuals ε_i and ε_j for $j \neq i$ are independent. To sum it up: if T tends to infinity individual Wald statistics $W_{i,T}$ are *i.i.d.* with $E(W_{i,T}) = K$ and $V(W_{i,T}) = 2K$. Then, the distribution of the average Wald statistic $W_{N,T}^{Hnc}$ when $T \rightarrow \infty$ first and then $N \rightarrow \infty$, can be deduced from a standard Lindberg-Levy central limit theorem. Therefore, under the *HNC* null hypothesis, the average statistic $W_{N,T}^{Hnc}$ sequentially converges in distribution. Let $Z_{N,T}^{Hnc}$ be the corresponding standardized statistic.

$$Z_{N,T}^{Hnc} = \sqrt{\frac{N}{2K}} (W_{N,T}^{Hnc} - K) \xrightarrow[T, N \rightarrow \infty]{d} N(0, 1) \quad (6)$$

where $T, N \rightarrow \infty$ denotes the fact that $T \rightarrow \infty$ first and then $N \rightarrow \infty$. For a large N and T sample, if the realization of the standardized statistic $Z_{N,T}^{Hnc}$ is superior in

absolute mean to the normal corresponding critical value for a given level of risk, the homogeneous non causality (*HNC*) hypothesis is rejected.

Asymptotically, individual Wald statistics $W_{i,T}$ for each $i = 1, \dots, N$, converge toward an identical chi-squared distribution. However, this convergence result can not be achieved for any time dimension T , even if we assume the normality of residuals. In this case, we propose to approximate the two first moments of the unknown distribution of individual Wald statistics by the corresponding moments of a Fisher distribution. Given the restrictions of our model, this distribution is a $F(K, T - 2K - 1)$. Indeed it is well known that in a dynamic model the F distribution can be used as an approximation of the true distribution of the statistic $W_{i,T}/K$ for a small T sample. Given these approximations, we propose to compute an approximated standardized statistic $\tilde{Z}_{N,T}^{Hnc}$ for the average Wald average statistic $W_{N,T}^{Hnc}$ of the *HNC* hypothesis.

$$\tilde{Z}_{N,T}^{Hnc} = \frac{\sqrt{N} \left[W_{N,T}^{Hnc} - N^{-1} \sum_{i=1}^N E(W_{i,T}) \right]}{\sqrt{N^{-1} \sum_{i=1}^N Var(W_{i,T})}} \quad (7)$$

where for an unbalanced panel :

$$\frac{1}{N} \sum_{i=1}^N E(W_{i,T}) \simeq K \times \sum_{i=1}^N \frac{(T_i - 2K - 1)}{(T_i - 2K - 3)} \quad (8)$$

$$\frac{1}{N} \sum_{i=1}^N Var(W_{i,T}) \simeq 2K \times \sum_{i=1}^N \frac{(T_i - 2K - 1)^2 \times (T_i - K - 3)}{(T_i - 2K - 3)^2 \times (T_i - 2K - 5)} \quad (9)$$

For a large N sample, under the HNC hypothesis, we assume that the statistic $\tilde{Z}_{N,T}^{Hnc}$ follows approximately the same distribution as the standardized average Wald statistic $Z_{N,T}^{Hnc}$.

$$\tilde{Z}_{N,T}^{Hnc} \xrightarrow[N \rightarrow \infty]{d} N(0, 1) \quad (10)$$

The test of the *HNC* hypothesis is built as follows. For each individual of the panel, we compute the standard Wald statistics $W_{i,T}$ associated to the individual hypothesis $H_{0,i} : \beta_i = 0$ with $\beta_i \in \mathbb{R}^K$. Given these N realizations, we get a realization of the average Wald statistic $W_{N,T}^{Hnc}$. Given the formula (10) we compute the realization of the approximated standardized statistic $\tilde{Z}_{N,T}^{Hnc}$ for the T and K values. For a large N sample, if the value of $\tilde{Z}_{N,T}^{Hnc}$ is superior in absolute mean to the normal corresponding critical value for a given level of risk, the homogeneous non causality (*HNC*) hypothesis is rejected.

What is the main advantage of this Granger non causality panel test? For instance, let us assume that there is no causality from x to y for all the N countries. Given the Wald statistics properties in small sample, the analysis based on N individual tests is likely to be inconclusive. With a small T sample, some of the realizations of the individual Wald statistics are likely to be superior to the asymptotic critical values of the chi-square distribution. These "large" values of individual statistics lead to wrongly reject the null hypothesis of non causality for at least some countries. The conclusions are then no clear cut. On the contrary, in our panel average statistic, these "large" values of individual Wald statistics are crushed by the others which converge in probability to zero. When N tends to infinity, the cross-sectional average is likely to converge to zero. The null hypothesis of homogeneous non causality hypothesis will not be rejected. In this sense, our testing procedure may be more restrictive and may result in more clear-cut conclusions as compared to those obtained with pure time series tests.

4 Data and measures of debt relief and concessionality rate

In this paper, we will use the concessionality rate of resources as an index for the “distance to the market”. In the usual sense (for instance in the World Bank database Global Development Finance), concessionality is measured for loans only, as the average grant element on new external debt commitments. The average grant element is the difference between the face value of the loan and the present value of the loan (calculated with a standard constant 10 percent interest rate), as a percentage of the face value of the loan. This usual definition of concessionality is defined as the variable “*CONCESS*” in the paper.

But this usual definition does not take into account all aspects of the issue we want to tackle. Public donors provide also grants, and some have been switching from loans to grants as a result of debt relief. For capturing this impact of debt relief, we will also use in this paper a broader index of concessionality, taking grants also into account.

More specifically, we define the modified concessionality rate (*CONCESS_MODIF*) as the ratio of the sum of the grant element of loans and grants (*GRANTS*) to the total amount of resources (concessional and non concessional lending plus grants). The grant element is the standard rate of concessionality of new external debt commitments (in percent) multiplied by the amount of disbursements on external debt (*LOANS*).

$$CONCESS_MODIF = \frac{(LOANS * \text{Concess rate on loans}) + GRANTS}{LOANS + GRANTS} \quad (11)$$

The concessionality rates may be sometimes negative if new external debt commitments

come with an interest rate which is higher than the market rate (which is the case for most MICs). The average concessionality rate for LICs has been increasing quite smoothly from 73.8 percent in 1985 to 89.6 percent in 2008. The calculation of the grant element here is the same as in the publications of the OECD DAC and is debatable because it always uses the same interest rate of 10 percent as a reference "market" interest rate.

For these reasons, we do not use for our calculation the concessionality rate as such, but the ratio between the concessionality rate, and the annual average concessionality rate for the 30 LICs of our panel. We call this variable *SPREAD*, by analogy with the spread calculation for interest rates. We proceed the same way with the extended concessionality rate by computing *SPREAD_MODIF*.

The variable "debt relief" (*REDDEBT*) poses problems. Basically, debt relief is an authorisation given by the creditor not to repay a certain amount of debt. This will result in the future in a lower debt service. So, two alternative approaches may be used for calculating the amount of debt relief. It could be calculated as a stock reduction, or as a flow reduction (the difference of debt service before and after debt relief). The choice between those two approaches depend upon the issue considered. If the issue is more on signalling (which is the case in this paper), the stock approach is likely to be the best. What we want to assess is the reaction of financing organizations to the fact that debt relief has been provided to a country. Alternatively, if we wanted to assess the impact of debt relief on public expenditure, the flow approach would be superior, as the fiscal space is created each year by the lower debt service.

Unfortunately, this is not exactly in line with the legal framework. Under the HIPC

initiative, debt relief is supposed to come on a yearly basis. Actually, HIPC initiative is not legally debt relief, it is a commitment of bilateral aid agencies to repay the debt in place of the HIPCs. At the opposite, the MDRI initiative is a one shot debt relief. This is the reason why we cannot use the amount of "debt forgiveness or debt reduction" in the World Bank Global development finance database. In this database, HIPC is in flows and MDRI in stocks, which is inconsistent for economic analysis, even if correct from a legal point of view.

For the purpose of this paper, we had then to build a new database providing debt relief in stocks. We used for that the Club de Paris database (for bilateral debt relief) and the IDA-IMF "Status of implementation of the HIPC-MDRI initiatives" documents for multilateral debt relief.

We build our sample taking into account 30 LICs. The time span is 1988 to 2008. We first considered a longer time period, as data are available from 1970 on. But structured debt relief initiatives actually begun in 1988. For this reason, it seems better to concentrate on the period of debt relief, taking only a few years before into consideration.

5 Results

For the sample considered, we test the causality from the debt relief *REDDEBT* to the usual (loans only) concessionality rate *SPREAD* (the ratio between the concessionality rate, and the annual average concessionality rate for the 30 LICs of our panel) as well as the reverse causal relationship. Then we use the extended (loans and grants) concessionality rate *SPREAD_MODIF* to test the same causality relationships. In each

case, we compute three statistics: the average Wald statistic $W_{N,T}^{HNC}$, the standardized statistic $Z_{N,T}^{HNC}$ based on the asymptotic moments and the standardized statistic $\tilde{Z}_{N,T}^{HNC}$ based on the approximation of finite sample moments. In order to assess the sensitivity of our results to the choice of the common lag-order, we compute all these statistics for one, two and three lags.

The results for the sample of 28 low income countries over the period 1988-2008 are reported in tables 1 to 4.

Table 1: Causality from Debt Relief to the Concessionality Rate of loans

Lag order	$K = 1$	$K = 2$	$K = 3$
<i>REDDEBT to SPREAD</i>			
W_{HNC}	1.1802	2.7967	5.0218
Z_{HNC}	0.6978 (0.4853)	4.3634 (0.0000)	13.5627 (0.0000)
\tilde{Z}_{HNC}	0.1724 (0.8632)	1.0603 (0.2890)	2.3815 (0.0172)
Notes: p-values in parentheses			

When the inference is based on the asymptotic standardized statistic $Z_{N,T}^{HNC}$ or on the approximated standardized statistic $\tilde{Z}_{N,T}^{HNC}$, the homogeneous non causality (HNC) between REDDEBT and SPREAD is almost always rejected at 5% level for lag 2 and 3 (the only exception is for a lag of two periods using \tilde{Z}_{HNC}). It means that that past

values of the countries' debt relief may be useful to forecast the concessionality rate of new loans. These results are in line with what mentioned before in the paper. Since the nineties, LICs have been granted debt relief by bilateral creditors and, later, by international financing institutions. From the standpoint of international investors and donors, debt relief may be seen either as a negative signal of incapacity to repay the former debt or as a positive signal of recovery of a capacity to repay. Here, the results suggest that there is a relationship between the debt relief and the concessionality rate. But these Granger causality tests in panel data give no information on the sign of this causal relationship. More precisely, it is not possible to assess the sign of the impact of debt relief on the concessionality rate of new financing flows.

Table 2: Causality from Debt Relief to the extended Concessionality Rate (loans and grants)

Lag order	$K = 1$	$K = 2$	$K = 3$
<i>REDDEBT to SPREAD_MODIF</i>			
W_{HNC}	1.4409	2.3028	5.9304
Z_{HNC}	1.8965 (0.0579)	1.6583 (0.0973)	196577 (0.0000)
\tilde{Z}_{HNC}	1.0962 (0.2730)	0.0354 (0.9718)	3.8034 (0.0001)
Notes: p-values in parentheses			

Taking into account the extended (loans and grants) concessionality rate (*SPREAD_MODIF*) rather than the usual concessionality rate does not modify drastically our previous results.

So, the debt relief initiatives have an impact on their "distance to the market", positive or negative. More research is needed to assess the sign of the relationship. If positive, the reason may be that poor countries are excluded from the market ("double original sin"), and rely on public donors who do not stop lending even after debt relief, and turn more and more to providing grants. If negative, it could mean that new lenders are likely to offset this trend and the crisis in developed countries may provide an opportunity for LICs to access to the international financial market. Moreover, because of the crisis some public Donors are running short on resources, and switch back from grants to loans.

Table 3: Causality from the standard Concessionality Rate to Debt Relief

Lag order	$K = 1$	$K = 2$	$K = 3$
<i>SPREAD to REDDEBT</i>			
W_{HNC}	1.0377	2.9780	5.4222
Z_{HNC}	0.1460 (0.8839)	5.3667 (0.0000)	16.2484 (0.0000)
\tilde{Z}_{HNC}	-0.2728 (0.7850)	1.4366 (0.1508)	3.0080 (0.0026)
Notes: p-values in parentheses			

Table 4: Causality from the extended Concessionality Rate to Debt Relief

Lag order	$K = 1$	$K = 2$	$K = 3$
<i>SPREAD_MODIF to REDDEBT</i>			
W_{HNC}	1.0999	2.8104	5.0648
Z_{HNC}	0.3869 (06989)	4.4389 (0.0000)	13.8508 (0.0000)
\tilde{Z}_{HNC}	-0.0785 (0.9375)	1.0889 (0.2762)	2.4487 (0.0143)
Notes: p-values in parentheses			

Looking at the reverse causality relationship (from the past values of the concessionality rate of new financing flows to the countries' debt relief), shows that the homogeneous non causality (HNC) is almost always rejected whatever the statistic used ($Z_{N,T}^{HNC}$ or \tilde{Z}_{HNC}) and this conclusion is robust to the choice of a lag of two or three periods. As for the reverse causality, these results imply that the concessionality rate of financing flows (either the useful or the extended one) might be useful to explain the values of the countries' debt relief for the 28 low income countries of our panel. This finding is in line with Easterly's claim that providing concessional financing to LICs results in lower governance and a lower willingness to repay (Easterly, 2002), if we assume that debt relief has been provided to countries that were not able to repay.

Table 5: Debt reduction and Modified concessionality ratio by country

Debt reduction as a % of 1988 debt stock ⁽ⁱⁱ⁾	Modified concessionality rate (spread)		
	Significant reduction ⁽ⁱ⁾	No significant change	Significant Increase
Low debt reduction	Chad Togo	Yemen, Rep.	Ethiopia Guinea Cote d'Ivoire
Medium debt reduction	Mali Mauritania	Benin Bolivia Burundi Niger Tanzania	Honduras Madagascar Mozambique Nicaragua Senegal Congo, Rep.
High debt reduction	Burkina Faso Sao Tome and Principe Sierra Leone	Malawi Rwanda	Cameroon Guyana Uganda

⁽ⁱ⁾ significant means more than 5 per cent.

⁽ⁱⁱ⁾ Low means lower than 100 per cent, Medium between 100 and 200 per cent. Remember that countries have been borrowing during the 1988-2008, so the debt reduction may well be more than the debt stock at the beginning of the period.

6 Conclusion

Is debt relief a bad signal for lenders?

Using the Granger causality test in a panel for 37 low income countries, we have shown that:

- First, the homogeneous non causality (HNC) hypothesis is robustly and strongly rejected when we investigate the causal relationship from from debt relief to the concessionality rate of new financial flows. So, the debt relief initiatives have an impact on the "distance to the market" for the 37 Lics of our panel.
- Second, looking at the reverse causality relationship (from the past values of the concessionality rate of new financing flows to the countries'debt relief), we find that the HNC is never rejected whatever the statistic used.
- Third, more research is needed to assess the sign of the relationship between debt relief and the concessionality rate because Granger causality tests in panel data give no information about the sign of the impact of the former on the borrowing conditions granted to low income countries. So, the debt relief initiatives have an impact on their "distance to the market", positive or negative. If positive, the reason may be that poor countries are excluded from the market ("double original sin"), and rely on public donors who do not stop lending even after debt relief, and turn more and more to providing grants. If negative, it could mean that new lenders are likely to offset this trend. The crisis in developed countries may provide an opportunity for LICs to access the international financial market. Moreover, because of the crisis some public Donors are running short on resources,

and switch back from grants to loans.

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Table 6: Panel Unit Root Tests. 28 Low Income Countries

<i>Variable</i>	$W_{IPS}^{(i)}$	$P_{MW}^{(ii)}$
REDDEBT	-9.162 (0.00)	313.05 (0.00)
SPREAD	-7.016 (0.00)	258.27 (0.00)
SPREAD_MODIF	-6.796 (0.00)	198.82 (0.00)

⁽ⁱ⁾ W_{IPS} denotes the standardized *IPS* statistic based on simulated approximated moments (Im, Pesaran and Shin, 2003, table 3).

⁽ⁱⁱ⁾ P_{MW} denotes the Fisher's test statistic proposed by Maddala and Wu (1999) and on individual ADF *p*-values. Under H_0 , P_{MW} has a χ^2 distribution with $2N$ of freedom when T tends to infinity and N is fixed. Corresponding *p*-values are in parentheses.

Table 7: List of countries

Benin	Guyana	Sao Tome and Principe
Bolivia	Honduras	Senegal
Burkina Faso	Madagascar	Sierra Leone
Burundi	Malawi	Tanzania
Cameroon	Mali	Togo
Chad	Mauritania	Uganda
Congo, Rep	Mozambique	Yemen, Rep.
Cote d'Ivoire	Nicaragua	Zambia
Ethiopia	Niger	
Guinea	Rwanda	