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Lending to the Poorest Countries: A New Counter-cyclical Debt Instrument

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PREFACE

The Highly Indebted Poor Countries Initiative finalized in Cologne, and the Multilateral Debt Relief Initiative, decided during the July 2005 G8 Summit in Gleneagles, have led to cancel the debt of the world's most indebted countries. Following these initiatives, doubts have risen regarding the ability of the poorest countries to ever repay their debts. The soft loan strategy of the development agencies became questionable: how old recipes can be expected to produce new results?

This Development Centre report argues that lending strategies towards the poorest countries remain most valuable, but should take into account of their vulnerability to exogenous shocks, in order to avoid the mistakes from the past.

One of the particular features of these economies is their volatility, due mostly to their dependence on commodities. The empirical analysis which is presented in the report documents this volatility and points towards its relationship with debt crises. The report proposes a new measure of shocks, defined as a deviation of 5 per cent of the relevant macroeconomic variable (in our case, exports earnings) from a 5-year moving average of its past values. Using data from 1970 to 2004 on 90 debt distress episodes, it shows that the likelihood that a country faces a debt crisis is significantly increased if it has experienced an exports shock in the three preceding years.

Based on this analysis, the report advocates the adoption by donors of a new lending instrument: the countercyclical loan (CCL). The idea is to reduce the grace period of a typical concessional loan, from 10 to 5 years, and to keep the remaining grace periods as an asset that the country can draw upon, when a bad shock occurs. Such instrument should allow the development agencies to resume lending to the poorest countries, while explicitly acknowledging the risks that have led in the past to the debt cancellations initiatives.

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ABSTRACT

One of the particular features of poor countries' economies is their volatility, due mostly to their dependence on commodities. The paper shows that this volatility is a prime factor behind the debt crises of the poorest countries. It advocates the adoption by donors of a new lending instrument: the countercyclical loan (CCL). The key idea is to reduce the grace period of a typical concessional loan, from 10 to 5 years, and to keep the remaining grace periods as an asset that the country can draw upon, when a bad shock occurs. If no such bad shocks happen, or infrequently enough, the "floating grace" is redeemed to the country at the end of the loan as a repayment in advance without penalties.

JEL Codes: F21, F34, F35.

Key words: Low Income Countries, Soft Loan, Export Shocks

RÉSUMÉ

Une des caractéristiques des pays les plus pauvres est leur volatilité. Cet article montre que ce risque est l'un des facteurs essentiels qui explique les crises de dette de ces pays. A partir de ces résultats, l'article plaide en faveur de l'adoption par les bailleurs de fond d'un nouvel instrument de prêt : le prêt contra-cyclique (PCC). L'idée principale est de réduire la période de grâce d'un prêt concessionnel typique de 10 à 5 ans, et de garder les années de grâce restantes pour les utiliser en cas de mauvais choc. Si le pays ne subit aucun choc ou trop peu, cette « grâce flottante » est rendue au pays avant la fin du prêt, sous forme de remboursement anticipé sans pénalité.

JEL Classification F 34 F 35

Mots clés : Pays Pauvres, Prêts Concessionnels, Chocs d'Exportations

I. INTRODUCTION

Poor countries' economies are more volatile than the richer ones. For instance, low income countries have experienced commodity price shocks on an average of one every 3.3 years for the last three decades. Exogenous shocks have significant direct adverse effects on growth and the secondary effects of negative terms of trade shocks can be large. Collier and Dehn (2001) show, for a sample of cases where the direct income loss averaged 6.8 per cent of GDP in the year of the shock, that the total correlated loss of income amounted to about twice that much (14 per cent of GDP), through the reduced growth channel. Shocks have a significant impact on fiscal and external balances. An IMF study shows that terms of trade shocks and adverse weather conditions have played an important role in creating debt problems¹. A recent study by Koren and Tenreyro (2007) investigates the links between volatility and development and points out that understanding the sources of volatility in less developed countries is of primary importance as income fluctuations are more abrupt in these countries and their ability to hedge against these fluctuations is limited by the weakness of their financial infrastructures.

This high volatility is one of the reasons why poor countries have no access to the world financial markets. A large number of low income countries are unable to borrow on international markets, either by issuing sovereign debt or by obtaining loans from foreign private banks. Their main source of financing is external borrowing from official concessional sources. Therefore very few market indicators are available to signal the risk of default on this external debt. Interest rates are usually very low and bear no real connection to the risk of non-repayment. This exclusion from financial markets can be the materialization of a very high probability of default for these countries, which increases considerably the borrowing cost for the debtor. For very high probabilities of default, the market is only willing to lend at high values of spreads, which in turn prevent the country to borrow and translate into exclusion from capital markets.

It also explains why loans to the poorest countries, even when made at concessional terms, are bound to degenerate into a build up of debt which eventually becomes unmanageable. About 24 formerly highly indebted countries² have an export concentration of more than 50 per cent in three or fewer commodities, while 70 per cent of the total exports of the least developed countries are unprocessed primary commodities³. The World Bank showed (1999) that the prices of many commodities fluctuated from below 50 per cent to above 150 per cent of their average

¹ *Brooks et al.* "External Debt Histories of Ten Low Income Developing Countries", IMF Working paper 98/72.

² See Appendix 1.4) for country coverage and data sources.

³ See Appendix 2, Table 1.

prices during the period 1983-1998. As a result, export revenues have been highly variable for these countries throughout the last decades: we calculated that, for our sample of 24 formerly highly indebted countries, the standard deviation of the level of exports expressed as a percentage of the mean has averaged 26 per cent for the period 1974-2005⁴. It is also the case that on average, export revenues in these countries fluctuated from 43 per cent to 205 per cent of their average level during the period 1970-2005.

The heavily indebted poor country (HIPC) debt reduction initiative has been seen as proof of failure of the soft loan strategy. The international agreement on debt relief (Multilateral Debt Relief Initiative, or MDRI) reached by the G-8 Finance Ministers in mid-2005 followed suit, canceling \$55.4 billions in loans owed to the World Bank, African Development Bank and International Monetary Fund⁵. These initiatives have led a number of authors to argue that loans to the poorest countries should be abandoned as a policy instrument in favour of grant only. If the private actors cannot be repaid, how could the public lenders expect to do better?

Although paradoxical at first glance, debt and debt cancellations are two complementary instruments which, if properly managed, perform better than either loans or grants taken in isolation (see Cohen, Jacquet and Reisen, 2007). Because of the fact that the poorest countries are also the most volatile, contingent facilities incorporating debt cancellation mechanisms, are a valuable instrument. How can we make them explicit in the debt contract rather than implicit?

An interesting idea, explored by Guillaumont *et al.* (2003), consists in using the subsidy element embedded in concessional loans to finance cushioning. The central repayment scheme would be based on constant annuities, but the loan would be associated with contingent grants provided in response to a temporary exogenous negative shock that would partly cover debt service. Such grants would be financed by a reduction in the primary loan concessionality, which means that the implied subsidy on the loan interest rate would be lower or the amortization period shorter. If no shock occurs during the amortization period, the associated grant might be used in whole or in part to cover the last payments under strict economic policy conditionality (to provide some incentive for sound management of any price booms).

It is on such an idea that we explore in this paper the design of a new counter-cyclical facility. Our idea is to transform the grace period of a typical concessional loan into a fixed initial grace period and a floating grace period, which the country can draw upon when a bad shock occurs. The bad shock is defined as an export shock, whereby current exports fall below a moving average of past values. If no such bad shocks occur, or infrequently enough, the floating grace is redeemed to the country at the end of the loan. Our main interest here is neither to study the contribution of export shocks to GDP volatility or the impact of external shocks on GDP growth, nor to eliminate or reduce exposure to volatility in low-income countries. We try to

⁴ See Appendix 2, Table 2.

⁵ The IDB decided to join the Initiative on January 2007. It will cancel \$4,4 billions for five Latin American Countries (Bolivia, Guyana, Haiti, Honduras, Nicaragua).

account for the relationship between this volatility and the difficulties a country might face in servicing its debt. The debt instrument we propose is not aimed at compensating the country for its losses due to exports shocks such as in an insurance scheme but simply at preventing the possible build up of a debt crisis, which could arise in addition to the exports crisis.

A number of instruments, such as the Stabex of the European Commission, have already been tried to help countries smooth their commodity shocks along similar lines (defining a shock as a deviation from a moving average). Lags of implementation have impaired the ability of this instrument to cushion external shocks. The instrument that we designed is aimed at allowing countries to react swiftly, the data upon which it is designed having a four months lag.

We explore a modification of the structure of typical concessional loans which offer long maturities (from 30 to 50 years), long grace periods (e.g. 10 years), and carry low interest rates. The counter-cyclical loan that we calibrate here stretches over 30 years and contains an initial fixed grace period of five years and a “floating” grace period of 5 years. This “floating” grace period can be drawn upon later on, anytime between years 6 and 30, in the event of an adverse shock. Regarding the interest rate, we calibrated two options. The first option is to charge an interest rate of 1 per cent. In that case, if worse comes to worse, the country may have to draw on its five floating grace episodes immediately after the initial five grace years. The new loan would be, *ex post*, identical to a loan with an initial ten-year grace period. If the country does not experience a shock right after the initial 5-years grace period, the repayments from years 6 to 10 constitute a financial effort on its part, compared to the worst scenario above (5 consecutive shocks after the fixed initial grace period). Therefore it is possible to expand its right to suspend the payment of the principal, as time passes, up to the market remuneration on these repayments. In the extreme case when the country never draws on its floating grace, the loan maturity can be shortened by 7 years, from 30 years to 23 years.

We also calibrated an option with a 1.5 per cent interest rate charged on the loan, in order to increase the flexibility given to the country, in the form of additional years of suspension. For example, if shocks occur right after the initial 5-year grace period, the country has the possibility to suspend its payments 6 years in a row (as compared to 5 in the former solution). In the extreme case when the country never draws on its floating grace, the loan maturity can then be shortened by 9 years, from 30 years to 21 years.

In the sequel of the paper, we first present an overview of the relationship between export shocks and debt service difficulties and econometric evidence of the relative contribution of export shocks to the probability of debt distress. We then give the details of the counter-cyclical debt instrument that we designed. We present afterwards a retrospective analysis of how such a loan would have performed in the past for a group of 24 poor countries. We finally review the technicalities involved in the choice of the trigger mechanism for allowing the country to draw on its floating grace periods.

II. VOLATILITY AND DEBT DISTRESS

In theory, the adjustment to a shock should depend on the nature of the shock. It is not the same thing to respond to a permanent and to a transitory shock. In fact, even if a shock is deemed to be transitory, there can be considerable uncertainty about how long it will take to be reversed. Over-optimism concerning the pace of a recovery has been a key factor behind the excessive accumulation of debt by poor countries. If a negative shock is expected to be reversed by a positive shock, it makes sense to finance the bad years out of savings. Poor harvests associated with poor weather can be expected to be matched by good harvests later on. Commodity prices, however, are usually very slow to recover from adverse shocks. This is one of the reasons why it has proven so difficult either to smooth their effect or to stabilize them. Countries that borrow when the prices are low are bound to face financial difficulties before the prices recover their previous levels. Mansoorian (1991) sheds light on the fact that in the 1970s a number of developing countries accumulated huge debts, following their discoveries of natural resources. Mexico and Venezuela provide good examples of such behaviors. The amount of debt incurred by these countries was so large that they were forced to undergo austerity measures in order to be able to pay the interest on their debts. According to Harberger (1985), Mexico and Venezuela should have treated their oil reserves as national wealth, and should have invested their oil revenues in long term investment projects. Instead, they borrowed extensively against these reserves, and used most of their borrowings to finance high levels of consumption or to invest in projects with low rates of return. Harberger argues that this lack of sufficient savings was one of the most important causes of the current debt problems of these countries.

The theory of sovereign debt postulates a key role, not only for the levels of solvency or liquidity indicators but also for their second moments, their volatility. In the standard version of their 1981 paper on the determinants of debt repudiation, Eaton and Gersovitz show that macroeconomic volatility plays a role in sovereigns' decision to default. When income variations are assumed to be predictable and capital markets strictly enforce punishment for defaulters by restricting future access to credit, higher income volatility lowers the incentive to default by preventing countries from smoothing consumption through international borrowing once they default. All else constant, the incidence of default should be lower in countries with higher income volatility. However, if income variations are stochastic, the paper shows that an unpredictable succession of bad shocks may turn the net marginal utility of defaulting positive. The relationship between volatility and debt distress depends on the relative balance between the country's willingness to pay and its capacity to pay, with both being a function of volatility. If governments are short-lived and do not fully internalize the costs of fiscal profligacy, higher macroeconomic volatility is likely to be positively related to default because countries that face a

greater dispersion of shocks will tend to experience output ranges which make it difficult to meet contractual debt obligations (Catão and Sutton, 2002).

II.1 Overview of Exports Crises and Debt Service Difficulties

As a simple yardstick, we have defined as external shocks all episodes during which a country's export earnings fell below a moving threshold defined as 95 per cent of the average of the past five years. Such a definition aims at coping with exceptional export movements around the trend, but not to correct for the trend itself. Therefore this shock criterion is set in a way that benefits the country facing exogenous export shocks (it has the desirable property of modulating debt service to the trend) while continuing to encourage the appropriate adjustments to permanent and recurrent shocks. As we investigate the links between volatility of export revenues and debt distress episodes, this threshold also appears to capture best what we are after, i.e a shock that hampers a country's debt service capacity. One could think of adding workers remittances to the definition of export revenues. The problem is that they are not easily measured through mirror statistics of the kind that we use. Furthermore, workers remittances are often contra-cyclical by themselves (when things go bad home, remittances increase).

The measure that we propose distinguishes itself from other more traditional measures of volatility such as standard deviations of terms-of-trade shocks or gdp growth. It incorporates some behavioural elements (the trend of a country's exports) and an element of volatility (understood here as a bad shock). The intersection of these two features doesn't lead to the same properties as other measures. The standard deviation of export revenues may be high for a country on an increasing trend but it is not as problematic as it may be for a country on a decreasing trend. Our indicator will be more prone to capture shocks for these particular countries than for the others. Indexing the financial instrument on this kind of measure minimizes the opportunities for moral hazard. There is no incentive to purposely influence the exports variable, given that the cumulative effect on the moving average would require that such an action be continued over several periods before debt service would actually be lowered. As debt service lies typically in the range of 10 to 30 per cent of exports earnings, a country doesn't gain much from manipulating its exports and we do not believe it would be able to do so. In fact, any IDA-dependent country undergoing the periodical reporting exercises conducted by the IMF and the World Bank would neither have the opportunity to cheat nor the incentive to do so if the scheme is deemed beneficial.

We defined a debt crisis episode from a slightly modified version of the database compiled by Kraay and Nehru⁶ (2004), which we updated in order to cover all debt distress events between 1970 and 2004. According to their definition, a debt crisis is defined as the occurrence of one of the following three events: debt arrears, Paris Club episode or IMF program. The largest sample allows us to identify 90 debt distress episodes, using their

⁶ Hereafter KN.

definition⁷. As we are interested in the correlation between export shocks and debt crises, we end up dealing with 68 debt distress events for which data on export earnings and other covariates are available. Using our definition of export shocks, we can identify their occurrence throughout the period for 61 poor or emerging countries. The average length of a debt crisis situation in our sample is 12.2 years and the median is 9.5, which shows that we are effectively dealing with relatively severe crises.

II.2 Econometric Evidence

In order to shed light on these issues, we have developed an econometric model in which we analyse the probability of a debt crisis, as a function of the level of debt, the level of income per head, an indicator of governance proxied by the Kaufmann, Kraay and Mastruzzi index of rule of law⁸ and the presence of an exogenous shock in the 3 years that preceded the debt crisis. As a measure of indebtedness, we use the debt service ratio, as a fraction of exports, and the Debt-to-GDP ratio in which GDP is measured in PPP terms (see Cohen and Villemot, 2006 on why this is a better denominator).

Following Kraay and Nehru (2004) we model the probability of debt distress using a probit specification: $P(y_{ct}=1) = \Phi(\beta'X_{ct})$, where y_{ct} is a dummy equal to one when country c experiences a debt distress episode beginning in year t and zero for normal times episodes beginning in year t . X_{ct} is our vector of determinants of debt distress, β are the parameters to estimate and Φ is the cumulative distribution function of the normal distribution. In our regressions, we measure each of the covariates three years before the debt distress event in order to mitigate the potential endogeneity bias. In order to simplify the interpretation of the coefficients we only present the marginal effects of each variable, keeping the other ones equal to their means.

In Table 1, we find that the likelihood of a debt crisis is indeed significantly triggered by the occurrence of an export shock in the years that preceded the crisis. The predicted probability that a country finds itself a situation of debt distress increases from 16 to 18 percentage points (depending on the specification) when it has experienced at least one exports shock in the three years before. The magnitude of this variable is quite substantial considering the fact that the unconditional probability in our sample of a country facing a debt crisis is 0.22. In columns 1 to 3, we simply report the marginal effects of all covariates. The coefficients on the debt burdens (measured in terms of PPP GDP or exports) are significant and show that the probability of a debt crisis increases as the debt ratios go up. The debt service to exports indicator is likely to be a better measure of the debt burden as the debt stock is expressed in nominal terms and not in net present value terms (this tends to overestimate the debt burden for countries whose loans are mainly concessional). Therefore this measure allows more reliable comparisons between countries with

⁷ For details, see Appendix 1 on data, methodology and sample.

⁸ This variable is a cross-section for all countries in year 2002. The results hold for other years available. We did not use the CPIA as a measure of institutional quality suspecting that this variable is largely pro-cyclical and therefore endogenous. Moreover, Kraay and Nehru used the Kaufmann, Kraay and Mastruzzi's indicator as a robustness check in their paper.

and without access to financial markets. It is useful to point here that the effect of the governance index is largely comparable to the effect of our exports shocks variable, drawing attention to the fact that they are as significant a determinant of debt crises (which was not the case in KN). As Ferrarini (2007) questioned the robustness of the coefficient on the index of rule of law used by Kraay and Nehru, we ran the same estimations without this governance variable and we found that all our parameters were of comparable magnitude and significance. The real GDP per capita is not significant in most of our specifications, as it is highly correlated with the governance proxy.

As we suspected that the thresholds above which the debt burdens significantly increase the probability of debt distress might vary with a country's market access, we augmented the benchmark estimation with such a variable and some interaction terms. To define market access, we used the classification made by Gelos, Sahay and Sandleris in their 2004 paper. They define market access as bond issuances by sovereigns and syndicated bank loans that are extended directly to the government or guaranteed by it for the period 1980-2000, resulting in an increase in the country's indebtedness. We use these data as country's fixed effects: we defined three groups of countries according to their market access: no access (no year of access), consistent access (access more than 65 per cent of the time period for which data are available) and occasional access (the residual). These groups are made respectively of 46, 24 and 50 countries. We created a dummy variable equal to one if the country has had occasional or consistent access throughout the period and 0 otherwise.

In Appendix 3, Table 2 shows that having market access does not seem to play significantly on the likelihood of a debt crisis. The interaction terms point in the direction of higher thresholds for the debt burdens (debt over GDP or debt service over exports) likely to trigger a debt crisis for market access with respect to countries with no market access but the coefficients are not significant. Similarly the interaction term of market access with the exports crisis variable is negative but not significant.

Table 1: Probit estimate of the likelihood of a debt distress episode
(only marginal effects are reported)

	(1)	(2)	(3)
log (Debt/PPP GDP)	0.15*** (0.05)		0.1** (0.04)
log (Per capita real GDP)	-0.02 (0.04)	-0.02 (0.04)	-0.07* (0.04)
TDS/Exports		0.92*** (0.21)	0.69*** (0.2)
Exports Crisis	0.18*** (0.07)	0.16** (0.07)	0.16** (0.08)
Index of Rule of Law	-0.17*** (0.04)	-0.15*** (0.04)	-0.15*** (0.04)
Number of observations	253	253	253
Pseudo R ²	0.15	0.16	0.19
Prob>Chi 2	0.0000	0.0000	0.0000

standard errors are between brackets

**** denotes 1% significance, ** denotes 5% significance, * denotes 10% significance*

Then we ran the same two models, one for the countries which have access to the financial markets and one for the countries with no such access in order to investigate the differential impact of exports crisis according to market access. We ran our regressions for several definitions of market access (mainly a dummy variable and a categorical variable defining 3 groups of countries as countries with no access, occasional access and consistent access) and in all specifications the results are similar. The results for the dummy variable are shown in Table 3.

Table 3: Probit estimate of the likelihood of a debt distress episode by market access**(1) market access (2) no market access***(only marginal effects are reported)*

	(1)	(2)
log (Debt/PPP GDP) _{t-3}	0.22*** (0.06)	0.04 (0.03)
TDS/Exports _{t-3}	0.82*** (0.26)	0.79** (0.37)
log(Per Capita Real GDP) _{t-3}	-0.14** (0.06)	-0.06* (0.03)
Exports Crisis	0.18* (0.1)	0.16*** (0.09)
Index of Rule of Law	-0.08 (0.05)	-0.13*** (0.05)
Number of observations	174	81
Pseudo R ²	0.19	0.35
Prob>Chi 2	0.0000	0.0000

*standard errors are between brackets***** denotes 1% significance, ** denotes 5% significance, * denotes 10% significance*

The exports crisis variable increases the probability of debt distress in both groups of countries and the effect is of comparable magnitude and statistically significant for the two groups of countries. The pseudo-R² of the regression is quite high for the non market access countries, which reassuringly leads us to believe that exports shocks play an important role in the advent of debt crises for these countries. The significance of the variable total debt service over exports in both groups of countries leads us to believe that not only does it correct for measurement as compared to the debt over GDP variable (we should take the debt NPV into account) but that it also plays a role in itself. This term is interpreted in the literature as a proxy for liquidity but it seems to us that it might not be an accurate explanation of its significance: as long as a country is not asked to repay its debt, it won't have to default on it (it can for example have taken up many loans and have a large debt stock but not have to repay because of grace periods). The debt service is simply a better and actual measure of the repayment burden.

Appendix 4 reports the probabilities of occurrence of debt distress episodes as estimated with our benchmark model (regression in Table 1, column 3). The unconditional probability of a debt crisis in our sample is 0.22 and it is usually against this probability that the predictive power of a model is gauged. Out of 68 debt distress episodes, our model predicts correctly 58. If we include the classification of normal time episodes, the overall percentage of correctly classified episodes is 75 per cent for a cut-off set at 0.5.

The volatility of exports revenues induced by external shocks is a critical feature of debt distress episodes for countries, which calls for innovative borrowing strategies on the part of these countries. In section III, we investigate the possibility of incorporating contingent facilities to traditional concessional loans in order to mitigate this specific vulnerability.

III. A NEW COUNTER-CYCLICAL DEBT INSTRUMENT

The previous sections shed light on the effect of exports shocks on a country's probability of default. Therefore we think that a lending strategy which would take into account this vulnerability to export shocks and its implication in terms of disruption of the ability to meet debt service obligations could go a long way in preventing the build up of debt problems especially in countries that don't have market access. It could also be the case that if the markets were capable to integrate contingent clauses to their debt contracts, the risk of default of these countries would be considerably lowered, allowing them to borrow internationally. A debt instrument linking repayments to export revenues seems to be most needed to preserve debt sustainability. As a matter of fact, in the current literature on debt sustainability too much attention has been given to expected levels of the relevant ratios (net present value of debt to exports and to GDP, debt service to exports) while sustainability is much more about limiting the likelihood of bad outcomes and countries' vulnerability to the volatility of these ratios of debt service to exports.

Guillaumont *et al.* (2003) usefully discuss several ways to dampen the impact of price shocks. One of them consists in explicitly linking debt repayments to the economic environment. An automatic adjustment of the public debt service to the evolution of export prices would reduce debt service during crises, and require faster repayment during booms. In a similar spirit, Gilbert and Tabova (2004) investigate the feasibility of a loan indexation on commodity prices⁹.

We explore here a somehow simpler version of this idea to change the repayment structure of a concessional loan in order to increase countries' flexibility in meeting their debt service obligations.

Concessional loans to the poorest country usually take a very simple form: they have very long maturities, very long grace periods and low interest rates. For example, IDA's typical loan stretches over 40 years, have a 10-year grace period and carry a 0.75 per cent interest rate. The logic of having low interest rates is relatively straightforward: the country being poor, it cannot pay for too much. The logic, however, of having a long grace period is less obvious. The grace period is generally intended to give time to the country to launch the project which is financed through the loan, once the financing decision is made. The need for long grace periods is less

⁹ Donors are currently experimenting with similar ideas. For example, the Agence Française de Développement (AFD) recently made a loan to a cotton company in an African country whose maturity depends on cotton prices. In the same spirit, other proposals have been made to preserve debt sustainability by indexing concessional loans to real exchange rates (see Yi and Vostroknutova, 2005 for example).

obvious if aid is geared towards sectoral or budgetary financing. Moreover it encourages government to take loans that they may not need, as the service of the debt really starts way in the future. For a government whose time horizon is relatively short, there may be no clear distinction between a loan and a grant.

Based upon these ideas, we calibrated the potential profile of a concessional loan with the following features: a 30-year maturity, an initial fixed grace period of five years, as compared to a more traditional 10-year grace period. The remaining five years are not lost to the country, however, but can be drawn upon later on, in the event of an adverse shock. We call them the “floating grace” period.

Regarding the interest rate, we calibrated two options. The first option is to charge an interest rate of 1 per cent. In that case, if worse comes to worse, the country may have to draw on its five floating grace episodes immediately after the initial five grace years. The new loan is, ex post, identical to a 30-year loan with a 10-year grace period.

In general however, this is not likely to be the case. The country will draw on its “floating grace” later on in time. As the amortization of the loan will typically start earlier (compared to the worst case scenario) if the country does not experience a shock right after the initial 5-year grace period, it is possible to give value on the market to the repayments from years 6 to 10, for the benefit of the country. This allows the country to expand its right to suspend the payment of the principal, as time passes¹⁰. If the country never draws on its floating grace, then it can shorten the length of its loans, net of the grace period (repayment in advance without penalties).

We also calibrated an option with a 1.5 per cent interest rate charged on the loan, in order to increase the flexibility given to the country. The differential of interest rates is also returned to the country, in the form of additional years of suspension.

In Table 4 below, we show how the number of suspensions evolves as time passes in both cases, under the assumption that a 3.5 per cent interest rate is paid on the assets. The number of possible suspensions beyond the initial grace period of 5 years varies between 5 and 7 years of payment (which corresponds to 10 to 14 semi-annual repayments) when the interest rate charged on the loan is 1 per cent and between 6 and 9 years of payment (12 to 18 semi-annual repayments) when the interest rate charged on the loan is 1.5 per cent.

¹⁰ Our main concern here is that the profile of repayments remains as neutral as possible from the borrower’s viewpoint regardless of the moment when he draws on his right to suspension.

Table 4: Characteristics of the Counter-Cyclical Loan

	Number of suspensions if the country is hit by consecutive shocks right after the initial grace period	Effective maturity of the loan if the country never experiences a shock
Maturity : 30 , Initial Fixed Grace Period: 5 , Interest Rate: 1%	5	23
Maturity : 30 , Initial Fixed Grace Period 5 , Interest Rate: 1.5%	6	21

Calculations are made under the hypothesis that a 3.5% interest rate is paid on the assets

It is worth pointing out that mutualization between countries has been excluded from our scheme. In the end the borrowing country receives the totality of its rights to suspension whether or not it has experienced shocks. This feature tries to mitigate the possibility of moral hazard. As a matter of fact, there is no reward for a country which uses its rights to suspension right after the initial grace period as compared with a country which capitalizes on its five initial rights.

As the number of suspensions is globally constrained, the borrowing country is thus not incited to behave badly in order to reap the benefit of payment suspensions right away.

Operational Challenges of the Implementation of the Export Shock Criterion

In order to allow for the use of the floating grace period, we chose to link the repayments of the country with its export earnings, expressed in the same currency as the one in which the loan has to be repaid. As we argued in section 2, export earnings are a natural indicator of a country's ability to face its debt service obligations in foreign currencies.

Export revenues capture two types of shocks: price and quantity shocks. We have already seen that commodity price volatility is an important determinant of export revenues volatility for countries highly dependent on a few commodities. Nevertheless shocks on quantities also tend to explain a good part of the variability. Indeed, Gilbert and Tabova (2004) showed that for 17 country-commodity pairs quantity and price variability appear to be of comparable magnitude, with a tendency for quantity effects to exceed price effects. Quantities are likely to be affected by presumably exogenous factors, among which weather conditions, strikes and civil wars.

If the obvious advantages of an index based on world prices lie in its immediate availability and the absence of possible manipulation by price-taker countries, the authors conclude on the weakness of the world commodity prices proxy to account for a country's ability to pay in their attempt to evaluate the benefit of linking concessional debt repayments to the evolution of commodity prices. Relying on a terms of trade trigger would also raise issues as it would limit applicability of the scheme to countries with high commodity concentration in imports and exports, whose international prices are readily available. Moreover, focusing only on commodity prices has the major drawback to assume that these countries' export structure is not going to change towards manufactured goods for example, at least for the next 30 or 40 years (i.e. the loan maturity). It may even prevent these countries to diversify their export basis away from commodities in the future in order to fully benefit from the scheme. In this respect the choice of export revenues seems also more relevant because it does not prejudge of a country's future export structure.

Nevertheless two main difficulties emerge with the choice of a criterion based on export revenues: incentives and timeliness. We have to take into account the incentives that the scheme is likely to generate for an indebted government in terms of policy and reporting. The borrowing country mustn't be able to misreport its trade statistics in order to benefit from payment suspensions. Therefore we chose to use mirror trade statistics, i.e. other countries' imports from the borrowing country. It is very unlikely that a country will be able to talk all his trade partners to misreport their import flows in order to trigger the mechanism. Of course, a government could be directly responsible for a fall in the quantum of exports, which would be picked up as such in mirror statistics, but as its total revenues are likely to hinge upon export taxes, it is very doubtful that a country may benefit from the voluntary disruption of its export flows (as mentioned above, the shock criterion is also set in reference to a moving average of the past years and debt service is only a small fraction of total exports). There's a possibility that a government can increase its income from exports taxes even though the country's exports quantities fall in order to reap the benefit of the scheme. Nevertheless the scheme is designed so as to mitigate this type of incentives, as there are only a limited amount of suspensions to draw upon. There is therefore no free lunch, i.e. no benefit from triggering the mechanism when there is no need to.

Export revenues however are known with a significant lag, which could deeply affect the counter-cyclicality of the loan. The efficiency of such a mechanism relies crucially on the availability of export data with very little lag. This constraint led us to focus on merchandise export revenues which are more readily available than total export earnings. Both are very well correlated for most of poor countries (in our sample of 24 HIPCs, the correlation between merchandise and total export earnings is on average 89 per cent for the last decade).

The Global Trade Atlas database (GTIS, Inc.) provides comprehensive data on trade flows¹¹ between 68 countries and the rest of the world on a monthly basis¹². OECD countries and many

¹¹ Sources: official country statistics, mainly customs data.

¹² For country coverage of the database, see Appendix 1.5.

Asian and Latin American countries belong to this database, which allows us to recover the value of their trade partner's exports, especially African countries' exports. All of them are available with a lag at most equal to 6 months (in order to be reactive on a semi-annual basis, we can focus on data available with a lag of at most 4 months, which only reduces the sample to 62 countries). It is worth pointing out that this database has only been put together quite recently, which may partly explain why such a mechanism was not available for highly indebted countries before.

These data are likely to capture a significant part of the export flows from a borrowing country, even if we miss intra-Africa trade which may be substantial. Given our measure of an export shock, a desirable feature of these data would be their correlation with total merchandise exports (if there's a shock on a country's export in year t , are we able to identify it with our data?). We checked this correlation for our sample of 24 countries by comparing their total exports to the rest of the world (measured as mirror statistics in the IMF database DOTS) during the period 1997-2006 and their exports to the 68 countries of the GTA database. The correlation coefficient between monthly series of export earnings between 1997 and 2006 is on average 0.76. The correlation is very high (see Table 5) except for a few countries¹³, which is quite reassuring. As the data in the GTA database only go back to 1997, we were not able to check more precisely the correlation between exports shocks in both series, for lack of observations available (the correlation is based on monthly data whereas the definition of a shock is based on annual data, which reduces the number of years available to only five).

Table 5: Correlation coefficient between countries' export earnings as measured by the GTA database and total export earnings as measured in DOTS (1997-2006)

	Correlation coefficient
Nicaragua	0.97
Congo. Rep.	0.96
Mauritania	0.95
Cameroon	0.95
Zambia	0.95
Bolivia	0.92
Chad	0.91
Uganda	0.91
Burkina Faso	0.90
Madagascar	0.89
Malawi	0.87
Ghana	0.85
Cote d'Ivoire	0.83

¹³ For some of them, the correlation coefficient is higher on the period 2000-2006 (better coverage by GTA)

Mali	0.78
Senegal	0.75
Burundi	0.72
Benin	0.67
Niger	0.63
Sierra Leone	0.62
Togo	0.57
Guyana	0.51
Rwanda	0.50
Guinea-Bissau	0.40
Gambia, The	0.30
AVERAGE	0.76

Once we have defined what constitutes an export shock, the automaticity of the suspension is an important feature of the counter-cyclical loan: if the criterion is met, the mechanism can be triggered by the country. Nevertheless it should not be an obligation: the country has the possibility to draw on its capital of floating grace periods and suspend its payments but is not forced to do so. As a matter of fact, its ability to pay might not be considerably affected by a shock especially if it has a lot of Forex reserves.

IV. A CALIBRATION EXERCISE

Out of the 68 debt distress events in our sample, 25 countries experienced an exports shock in the three years preceding the debt crisis. The question we asked next is the following: had these exports shocks not taken place in these countries, what would have been their probability of facing debt distress? We classified these probabilities in three categories according to the predicted probability we got from the benchmark regression (Table 1, col.3): high risk of debt distress (>50 per cent), moderate risk of debt distress (between 30 and 50 per cent), low risk (<30 per cent). These thresholds are chosen so as to have three groups with the same number of distress events. Table 6 below reports the change of risk classification when we neutralize the effect of the exports shock variable:

Table 6: Change in Risk Classification

Country	Year of the debt distress event	Risk classification	Risk classification if no exports shocks
Sierra Leone	1976	high	moderate
Gabon	1986	moderate	low
Benin	1983	moderate	low
Uruguay	2002	moderate	low
Nigeria	1986	high	high
Burundi	1998	high	high
Kyrgyz Republic	2002	moderate	low
Solomon Islands	2002	high	moderate
Uganda	1976	moderate	low
Niger	1983	high	moderate
Algeria	1994	high	high
Sao Tome and Principe	1986	high	moderate
Nicaragua	1983	high	moderate
Equatorial Guinea	1970	moderate	low
Rwanda	1994	high	moderate
Malawi	2001	high	moderate
El Salvador	1990	high	moderate
Georgia	1995	low	low
Trinidad and Tobago	1988	low	low
Ethiopia	1991	high	high
Venezuela	1989	high	high
Tunisia	1986	moderate	low
Cameroon	1987	high	moderate
Argentina	1983	high	high
Kenya	2000	high	moderate

The estimated probability of facing a debt distress is significantly lowered for most of the countries which experienced exports shocks, as illustrated by the change of risk category for 17 countries out of 25.

V. CONCLUSION

The particular vulnerability of poor countries to exogenous shocks is in part responsible for their lack of growth but it also threatens their debt sustainability. Export shocks are likely to disrupt their ability to service their debt in the future, as they did in the past. Drawing the lessons from many debt crises, we propose here a new counter-cyclical facility which matches debt service obligations faced by indebted governments with their ability to meet these obligations, as measured by their export earnings. As far as debt sustainability is concerned, much attention is currently given to expected outcomes for the borrowing country such as levels of its debt service to exports ratio or net present value of debt to exports. We advocate that as much attention should be given to the likelihood of borrowing countries facing very high ratios of debt service to exports for example. A lending strategy which internalizes the volatility of export earnings as long as it preserves incentives, is likely to do a better job at preventing debt distress than the former soft loan strategy, if only because introducing some flexibility in the repayment structure of their loans makes sense for countries whose revenues are very volatile. Nevertheless such a renovation of sovereign lending will only be effective if most donors are ready to adopt equivalent lending strategies and coordinate their attempts to preserve the countries' debt sustainability.

APPENDIX 1

1) Data

- a) Export earnings: *World Development Indicators (2006)*
- b) US Consumer Price Index: *International Financial Statistics (2006)*
- c) Payment arrears and debt levels: *Global Development Finance (2006)*
- d) Commitments under Standby Arrangement/Extended Fund Facility programs: *International Financial Statistics (2006)*
- e) Information on debt relief : *Paris Club website*

2) Methodology

a) Debt distress events:

We used the same methodology as Kraay and Nehru in their 2004 paper to define debt distress episodes. Thus a country is considered to be in debt crisis if at least one of the three conditions holds:

- the country receives debt relief from the Paris Club in the form of a debt reduction and/or a rescheduling
- the sum of its principal and interest arrears is large relative to the outstanding debt stock (more than 5 per cent of the outstanding debt stock)
- the country receives substantial balance of payments support from the IMF through a non-concessional Standby Arrangement (SBA) or Extended Fund Facility (EFF) (in excess of 50 per cent of the IMF quota)

b) Export shocks

Data on export earnings from the WDI are in current US dollars. As inflation is quite variable during the period under consideration (1970-2004), we used the US Consumer Price Index (IFS) to express export revenues in 2004 US dollars and we imposed on these deflated data an annual inflation rate of 2 per cent. This allows us to mitigate the effect of inflation on our measure of volatility. Had we not correct for inflation variations, we would have severely underestimated exports volatility during high inflation periods (presumably the 1970's).

An export shock is defined as follows: we compare a country i's export revenues in year t to their average of the five last years and if this ratio is less than 0.95 the country is said to have experienced a shock in year t.

c) Definition of market access

We used the classification made by Gelos, Sahay and Sandleris in their 2004 paper. They define market access as bond issuances by sovereigns and syndicated bank loans that are extended directly to the government or guaranteed by it for the period 1980-2000, resulting in an increase in the country's indebtedness. We use these data as country's fixed effects: we defined three groups of countries according to their market access: no access (no year of access), consistent access (access more than 65 per cent of the time period for which data are available) and occasional access (the residual). These groups are made respectively of 46, 24 and 50 countries. We created a dummy variable equal to one if the country has had occasional or consistent access throughout the period and 0 otherwise.

3) List of Countries for Tables 1 and 2

This sample of countries is selected as follows: all countries present in Kraay and Nehru's database for which data on export revenues 5 years before each debt distress event are available in the 2006 WDI.

Sub-Saharan Africa (SSA): Benin, Burkina Faso, Burundi, Cameroon, Congo Dem. Rep., Congo Rep., Cote d'Ivoire Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Niger, Nigeria, Rwanda, Sao Tome, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Togo, Uganda.

Latin America and Caribbean (LAC): Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Paraguay, Peru, Trinidad and Tobago Uruguay, Venezuela.

Asia (ASIA): Bangladesh, Georgia, India, Indonesia, Kyrgyz Republic, Pakistan, Philippines, Thailand, Solomon Islands.

Middle East and North Africa (MENA): Algeria, Egypt, Jordan, Morocco, Tunisia, Turkey.

4) Export Shocks: Number and Years

We used the subset of the heavily indebted poor countries, for which export earnings are available throughout the period 1970-2005 in the 2006 WDI.

Countries	Number of shocks	Years
Benin	5	83, 84, 89, 92,00
Bolivia	5	81, 83, 84, 85, 99
Burkina Faso	9	82, 83, 84, 85, 92, 93, 94, 00,01
Burundi	18	80,81,82,83,87,89,90,91,92,93,94,96,98,99,00,01,02,03
Cameroon	8	87, 88, 89,90, 93, 94, 95,96
Chad	12	80,81,82,83,85,92,93,94,99,00,01,02
Congo, Rep.	5	86, 87, 88, 93,94
Cote d'Ivoire	10	81, 82, 83, 84, 88, 89, 91, 93, 00,01
Gambia	10	84, 85, 86, 94, 95, 96, 97, 01, 02,03
Ghana	8	76, 77, 78, 79, 80, 81, 82,83
Guinea-Bissau	6	82, 83, 85, 86, 92,98
Guyana	9	79, 81, 82, 83, 84, 85, 86, 90,01
Madagascar	6	81, 82, 83, 84, 85,02
Malawi	10	82, 83, 85, 86, 89, 93, 94, 00, 01,02
Mali	3	82, 83,85
Mauritania	12	77,78,79,92,93,94,97,98,99,00,01,03
Nicaragua	12	79,80,81,82,83,84,85,86,89,90,91,92
Niger	12	82,83,84,85,86,89,90,91,92,93,94,97
Rwanda	13	81, 82, 83,87,88,89,90,91,92,93,94,95,96
Senegal	10	78, 80, 81, 82, 83, 85, 93, 94, 97,00
Sierra Leone	17	76,77,82,83,84,85,86,90,91,92,95,96,97,98,99,00
Togo	11	80,81,82,83,84,85,91,92,93,94,00,01
Uganda	14	75,76,77,80,81,82,83,89,90,91,92,93,00,01
Zambia	15	75,77,78,81,82,83,84,85,86,87,93,96,98,99,00
AVERAGE	10	

5) Global Trade Atlas: Country Coverage and Data Availability

Reporting Countries Import Statistics (Partner Country: World)			
Commodity: _Total, All Commodity Chapters			
Year To Date: January - January			
Reporting Country	Data Availability	Reporting Country	Data Availability
New Zealand	01/96 - 12/06	Nicaragua	01/04 - 12/06
China	01/95 - 01/07	Algeria	01/00 - 12/06
Japan	01/95 - 01/07	Argentina	01/97 - 12/06
Switzerland	01/96 - 01/07	Australia	01/95 - 12/06
Norway	01/97 - 01/07	Austria (Customs)	01/02 - 12/06
Peru	01/98 - 01/07	Belgium	01/99 - 11/06
Paraguay	01/01 - 01/07	Brazil	01/97 - 11/06
Panama	01/02 - 11/06	Canada	01/95 - 12/06
Philippines	01/97 - 10/06	Chile	01/97 - 12/06
Poland	01/99 - 11/06	Colombia	01/95 - 12/06
Portugal	01/97 - 10/06	Costa Rica	01/00 - 06/06
Romania	01/99 - 11/06	Croatia	01/02 - 12/06
Russia	01/97 - 09/06	Cyprus	01/99 - 11/06
Serbia	01/00 - 11/06	Czech Republic	01/99 - 11/06
Singapore	01/99 - 11/06	Denmark	01/97 - 11/06
Slovakia	01/99 - 11/06	Ecuador	01/01 - 12/06
Slovenia	01/99 - 11/06	Estonia	01/99 - 11/06
South Africa	01/96 - 12/06	Finland	01/97 - 11/06
South Korea	01/96 - 11/06	France	01/99 - 12/06
Spain	01/97 - 11/06	Germany	01/97 - 11/06
Sri Lanka	01/98 - 12/06	Greece	01/97 - 11/06
Sweden	01/97 - 11/06	Guatemala	01/02 - 12/06
Taiwan	01/96 - 11/06	Honduras	01/03 - 06/06
Thailand	01/98 - 12/06	Hong Kong	01/97 - 12/06
Turkey	01/98 - 12/06	Hungary	01/99 - 11/06
Ukraine	01/02 - 12/06	Iceland	01/97 - 12/06
United Kingdom	01/97 - 12/06	India	01/99 - 08/06
United States	01/95 - 12/06	Indonesia	01/96 - 10/06
Uruguay	01/02 - 07/06	Ireland	01/97 - 11/06
Venezuela	01/99 - 10/06	Italy	01/97 - 11/06
Latvia	01/99 - 11/06	Malta	01/99 - 12/06
Lithuania	01/99 - 11/06	Mexico	01/95 - 11/06
Luxembourg	01/99 - 11/06	Morocco	01/02 - 09/06
Malaysia	01/97 - 10/06	Netherlands	01/97 - 11/06

APPENDIX 2: HIPC DEPENCE ON COMMODITY EXPORTS AND VOLATILITY

Table 1: HIPC dependence on Commodity Exports

	Leading commodities	Main commodities as % of merchandise exports (2005)
Benin	cotton, nuts, tobacco	7.7
Bolivia	gas, metals, oils	6.6
Burkina Faso	cotton	7.8
Burundi	metals, coffee, tea	8.6
Cameroon	fuels, wood, cocoa	7.4
Chad	na	na
Congo, Rep.	fuels, wood	9.5
Cote d'Ivoire	cocoa, fuels, wood	6.8
Gambia, The	fish, vegetables, nuts	3.7
Ghana	cocoa, metals, wood	7.3
Guinea-Bissau	fruits, fish	7.9
Guyana	sugar, precious stones, fish	6.6
Madagascar	coffee, tea, fish, fruits	5.5
Malawi	tobacco, coffee, sugar	7.6
Mali	cotton, precious stones	8.3
Mauritania	na	na
Nicaragua	coffee, meat, fish, sugars	4.5
Niger	ores, precious stones, livestock	7.8
Rwanda	coffee, ores, fuels	8.0
Senegal	fuels, fish, phosphates	4.5
Sierra Leone	cocoa	8.5
Togo	salt, cotton, iron, cocoa	5.0
Uganda	coffee, fish, precious stones	5.3
Zambia	copper, metals, ores	7.6
AVERAGE		6.5

Source: Authors' calculations based on UN Comtrade, country snapshot

Table 2: HIPC Volatility of Exports

	Variability of Exports 1/ %		
	1975-1985	1985-1995	1995-2005
Benin	3.8	1.3	2.7
Bolivia	2.4	2.5	2.7
Burkina Faso	2.4	2.8	1.9
Burundi	2.5	1.4	3.9
Cameroon	4.6	1.9	2.8
Chad	2.2	1.6	12.5
Congo, Rep.	5.5	2.3	3.2
Cote d'Ivoire	2.9	.2	1.3
Gambia, The	3.2	3.9	1.5
Ghana	3.1	2.4	1.1
Guinea-Bissau	3.8	4.7	4.0
Guyana	2.6	3.2	.9
Madagascar	1.8	1.3	2.4
Malawi	2.2	2.9	.9
Mali	3.2	2.1	3.7
Mauritania	2.5	.7	1.0
Nicaragua	1.6	1.7	2.4
Niger	3.2	1.5	1.5
Rwanda	3.9	3.0	2.3
Senegal	1.3	1.1	2.9
Sierra Leone	3.7	3.9	2.9
Togo	2.2	2.9	1.9
Uganda	3.1	3.6	1.9
Zambia	2.3	1.4	1.2
AVERAGE	2.5	2.7	2.7

1/ Standard deviation in levels of exports of goods and services, in percent of the average

Source: Authors' calculations, WDI 2006

APPENDIX 3

Table 2.: Probit Estimate of the Likelihood of a Debt Distress Episode
(only marginal effects are reported)

	(1)	(2)	(3)
log (Debt/PPP GDP)	.17** (.06)		.1** (.05)
log (Per capita real GDP)	-.07* (.04)	-.05 (.04)	-.03 (.04)
TDS/Exports		.1*** (.32)	.72*** (.22)
Exports Crisis	.17** (.08)	.13** (.07)	.19** (.09)
Index of Rule of Law	-.15*** (.04)	-.11*** (.04)	-.15*** (.04)
Market Access	-.04 (.18)	.03 (.12)	.0005 (.07)
Market Access*log (Debt/PPP GDP)	-.07 (.04)		
Market Access*TDS/Exports		-.24 (.44)	
Market Access* Exports Crisis			-.09 (.11)
Number of observations	255	257	253
Pseudo R ²	.16	.17	.19
Prob>Chi 2	.0000	.0000	.0000

APPENDIX 4:
PREDICTED PROBABILITIES FOR DEBT DISTRESS EVENTS

Country	Year	Predicted Probability of Crisis
Georgia	1995	.03
Uruguay	1983	.09
India	1981	.1
Egypt	1977	.12
Costa Rica	1980	.12
Thailand	1997	.13
Turkey	1978	.15
Senegal	1980	.17
Trinidad et Tobago	1988	.18
Chile	1983	.2
Morocco	1980	.22
Philippines	1976	.22
Burkina Faso	1987	.23
Togo	1978	.23
Egypt	1984	.24
Malawi	1979	.25
Kenya	1975	.29
Paraguay	1986	.29
Haiti	1978	.29
Gabon	1986	.3
Turkey	1999	.3
Bangladesh	1979	.3
Uruguay	2002	.3
Tunisia	1986	.31
Uganda	1976	.31
Pakistan	1994	.32
Jordan	1989	.33
Dominican Republic	1983	.33
Ghana	1996	.34

Brazil	1998	.37
Equatorial Guinea	1970	.38
Congo, Dem. Rep.	1976	.4
Benin	1983	.4
Honduras	1979	.41
Guinea-Bissau	1981	.42
Colombia	1999	.43
Sudan	1977	.43
Madagascar	1980	.44
Country	Year	Predicted probability of crisis
Ecuador	1983	.44
Pakistan	1980	.44
Indonesia	1997	.45
Somalia	1981	.45
Ecuador	2000	.46
Liberia	1980	.46
Peru	1977	.48
Kyrgyz Republic	2002	.48
Rwanda	1994	.5
Cote d'Ivoire	1981	.5
Sierra Leone	1976	.51
Malawi	2001	.52
Mexico	1983	.52
Jamaica	1977	.53
Solomon Islands	2002	.54
Cameroon	1987	.55
Nicaragua	1983	.56
El Salvador	1990	.56
Congo	1985	.58
Kenya	1992	.63
Niger	1983	.64
Brazil	1983	.64
Kenya	2000	.64
Sao Tome	1986	.68
Venezuela	1989	.82
Burundi	1998	.83
Ethiopia	1991	.86
Algeria	1994	.88
Nigeria	1986	.94
Argentina	1983	.97

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