The importance of a better design of conditionality for improving

implementation of World Bank-supported reforms: The case of Sub-Saharan

African countries

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Abstract

Some recent empirical research suggests that the implementation of policy reforms is largely dependent on domestic political economy factors. This finding is taken to suggest that aid and adjustment lending should only be provided to those countries that, on the basis of certain characteristics, are more likely to implement policy reform. We put these issues to scrutiny by employing a sophisticated World Bank dataset to explain Sub-Saharan African programme countries' compliance record. Our empirical results highlight the role of a country's income status, economic performance and political stability during the programme, the external economic environment, the size of financial support for the reform programme, and initial macroeconomic conditions. These results contradict the evidence underpinning the selectivity approach to policy-based lending and suggest that poor compliance is not the result of low implementation capacity and poor institutional quality alone but also a consequence of poor policy design.

1. INTRODUCTION

A worrying finding of evaluation studies of World Bank structural adjustment operations is that compliance with the policy conditions set out in the programmes is low. This problem is particularly severe in Sub-Saharan Africa, where, according to World Bank (1997), 14 out of the 37 countries in the region that took advantage of the structural adjustment lending facilities have a very poor compliance record.[1] Such unsuccessful lending entails significant costs, as these countries received $4.3 billion, equivalent to a third of the total lending to Sub-Saharan Africa.

It is perhaps on the basis of this discouraging finding that it has been suggested that policy conditionality should be replaced by 'selectivity.' According to this approach aid and adjustment lending are only provided to those countries that, on the basis of certain characteristics, are more likely to implement policy reforms. The intellectual foundation for such a dramatic shift in the philosophy of policy-based aid is the research on aid effectiveness and the factors determining success or failure in World Bank adjustment operations (Burnside and Dollar, 2000; Dollar and Svensson, 2000; World Bank, 1998).

In particular, in an influential study, Dollar and Svensson (2000) find that programme success is largely dependent on some political economy factors within the country attempting to reform, namely, the degree of ethnic fractionalisation, democracy, length of tenure of the incumbent that signed the reform, and political stability during the implementation of the programme. By contrast, factors that reflect the World Bank's efforts – such as the resources devoted to analytical work prior to reform, the resources devoted to preparation and supervision of adjustment loans, the number and the sequencing of conditions – are irrelevant for the programmes'

outcome.

Dollar and Svensson conclude that "the role of donors is to identify reformers not to create them. Development agencies need to devote resources to understanding the political economy of different countries and to finding promising candidates for support. The key to successful adjustment lending is to find good candidates to support" (p. 896). Using the same methodological approach, Ivanova *et al.* (2003) reach broadly similar conclusions for a set of International Monetary Fund-supported programmes.

Although there is a large literature analysing the effectiveness of conditionality which expresses the view that aid and conditionality do not have much effect on the recipient government's policies (e.g. Rodrik, 1996), to our knowledge Dollar and Svensson and Ivanova *et al.* are the only two contributions containing a formal econometric study of compliance. Their results are stark and controversial and deserve in our view closer scrutiny. Although there might be questions concerning their econometric approach as well as their interpretation of results, we do not dwell on them here, since lack of access to the data set used in those papers prevents a replication of this work.

Nevertheless, the World Bank (1997) has published a set of data that is particularly appropriate to have another look at the issues raised by Dollar and Svensson (2000) and Ivanova *et al.* (2003). We maintain that these data, though still imperfect, are qualitatively superior to those used by Dollar and Svensson or, though we will not be concerned with IMF programmes, by Ivanova *et al.*. These data allow a classification of Sub-Saharan African programme countries according to their compliance with adjustment lending conditionality.

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1. World Bank (1997) provides an assessment of compliance for 35 of these countries.

On the basis of this country typology we attempt to identify the factors that empirically affect the likelihood of programme countries' compliance. This is a worthwhile effort. If such factors are beyond the World Bank's influence, the selectivity approach may be justified and the allocation of the Bank's scarce resources can be improved by switching lending from the countries that on the basis of these factors are identified as less likely to comply towards those identified as potential compliers. On the other hand, if there are factors within the World Bank's influence that affect the likelihood of compliance, the allocation of resources can be improved by modifying certain 'unsuccessful' aspects of programmes. In this case, the spotlight turns on the quality of policy advice. The underpinning for either position is a better understanding of the determinants of compliance.

This paper is arranged as follows. In Section Two we criticize the choice of dependent variable in Dollar and Svensson (2000). In Section Three we discuss the World Bank (1997) data on compliance and the construction of the dependent variable used in this paper. In Section Four we present the methodology of this study. In Section Five we review the theory of the determinants of compliance and discuss the selection of explanatory variables. We present the econometric results in Section Six. We draw conclusions and discuss policy implications in the last section.

2. THE DEPENDENT VARIABLE IN DOLLAR AND SVENSSON

In the main text of their article, Dollar and Svensson affirm that programme success is defined in terms of the stated objective of reforms. That is, their binary dependent variable embodies an "assessment of whether reform has taken place…has trade become more liberal, have enterprises actually been privatised?" (p. 897). However, the appendix on the definition of variables makes it clear that there is a lot more to

their dependent variable than a simple assessment of compliance. Dollar and Svensson explain in fact that their measure of programme success is based on "assessments of whether the reform design was appropriate in terms of reducing poverty and fostering growth in the private sector, and to what extent stated policy goals have been met" (p. 915). In other words, their dependent variable is a composite variable that is meant to reflect both the extent to which reforms have been implemented and the (expected?) success of reforms in reducing poverty and fostering growth in the private sector. We would argue that this dependent variable, when defined in this manner, is embracing too many aspects of adjustment lending to be usable in econometric work.

While Dollar's and Svensson's description of the construction of the index of reform success has a somewhat ambiguous meaning, it is clear that there are a number of problems with such an index. Some are logical difficulties concerning the definition of the index. For example, what is the role of the assessment of the appropriateness of the reform design when one is interested in reform implementation? And why is the appropriateness of the reform design only evaluated with respect to poverty reduction and growth? Since reform measures differ across countries (for example, some reform programmes may have been specifically aimed at reducing inflation, while others may have been aimed at liberalising trade in an environment of already stabilised inflation), it is debatable that growth and poverty reduction should be the sole relevant yardsticks. Moreover, it is somewhat puzzling that the appropriateness of the design of reforms undertaken in the 1980s should be evaluated with respect to poverty reduction when the objective of poverty reduction was made explicit in structural adjustment programmes only in the 1990s. And at what level are poverty reduction and growth considered as adequate?

There are also technical problems concerning the relative weights of the various components of the index of reform success. How is the assessment of the appropriateness of the reform design combined with the assessment of the extent to which stated policy goals have been met? And how is poverty reduction weighted against private sector's growth?

To summarise, we contend that the composite dependent variable that Dollar and Svensson have employed for their empirical analysis makes their econometric results uninterpretable because it measures different things at the same time. While far from ideal, our dependent variable, which we discuss in the next section, does not suffer from this problem since it captures only countries' compliance with conditionality.

3. DATA ON COMPLIANCE

A major hindrance to research in this area is the unavailability of data on countries' compliance with conditionality. For those who do not have access to the confidential databases available to World Bank staff, the only published source of data on this aspect is the World Bank (1997) report on adjustment lending in Sub-Saharan Africa. In this publication, the World Bank classifies the Sub-Saharan programme countries according to their degree of compliance with policy conditions during their adjustment period. This classification is at the core of this paper.

More precisely, for each country the World Bank has first rated compliance with each policy measure included in the supported programmes. Then, by averaging the ratings, it has produced the country index of overall compliance on the basis of which it has classified the programme countries as *good*, *weak* or *poor* compliers.

The compliance index is however liable to criticisms from various angles.

First, the technical specification of the index is arbitrary and the ranking of countries may not be robust (see Mosley, Subasat and Weeks, 1995, for an extensive discussion).[2] To account for this problem, we modify the index of compliance into a 0-1 indicator that classifies countries as compliers or poor compliers without trying to precisely identify different degrees of compliance. (The country typology is reported in Appendix A). Moreover, we also investigate the effect on our results of excluding the weak compliers from the group of compliers, as these are the countries whose classification is potentially less precise.

A second criticism is that the assessment of compliance may have been influenced by the strength of the countries' economic performance. However, as already noted by Dollar and Svensson (2000), the independence of the Operations Evaluation Department (which is responsible for the formulation of the index) within the World Bank should imply that there is no systematic bias in the compliance ratings.

A third line of criticism is based on the argument that the decision to lend is often politically motivated (Alesina and Dollar, 1998; Stiglitz, 1998). Lending may be granted to certain countries, despite their reluctance to undertake reforms, for a number of reasons: for example, to protect the continued servicing of past loans, to defend the institutional credibility that has been invested in previously backing those countries, or as a result of pressures from one or more major developed-country shareholders of the Bank, or even due to an internal system of incentives whereby World Bank staff perceive that they could enhance their careers by maintaining high

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2. To be precise, Mosley, Subasat, and Weeks (1995) address their criticisms to the index of macroeconomic adjustment presented in World Bank (1994). However, since both this index and the compliance index are constructed according to a similar methodology, they are liable to common criticisms.

levels of lending (Killick, 1996; Mosley, 1992). In these circumstances, the loan may be accompanied by a large number of conditions that are either easy to implement or already implemented – a practice that has been colourfully referred to as 'Christmas-lights conditionality.'[3] If this is true, critics may argue that the index of compliance has little information content.

This leads us to highlight an important characteristic of the index, which makes it not much vulnerable to this criticism: compliance is evaluated with respect to whether a given reform in a certain country has truly taken place. In other words, the index of compliance takes full account of the fact that a programme country that is not serious about reforms can flout conditionality in many ways: for example, it may implement less important conditions while making little progress on the relevant ones; or it may implement the conditions but may either simultaneously introduce countervailing measures or reverse the reforms soon after implementation. Therefore, a country that receives a loan with Christmas-lights conditionality would still receive a poor score for compliance, not a good one.

The need to take into account the different ways of circumventing conditionality has implications for the assessment of compliance. First, the index of compliance might have to be based on a subjective judgement rather than on a mechanical calculation of the fraction of conditionality implemented (Ivanova *et al.*, 2003, use the latter approach to construct one of their dependent variables). Second, compliance should conceptually be evaluated with respect to conditions and reform measures agreed over time in a given country rather than with respect to the conditions in individual loans – precisely as is done in the 1997 World Bank report on adjustment lending used here. Measures of compliance having the individual loan

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3. We heard this expression at a seminar on the relationship between compliance and

rather than the country as the 'unit of account' (as in Dollar and Svensson, and Ivanova *et al.*) could give a biased representation of true compliance. The difference between the two approaches can be quite substantial. For example, World Bank (1992) reports that Sub-Saharan African countries' compliance with conditions in individual adjustment loans between 1980 and 1990 was quite high: 73% of all loan conditions were fully implemented and 87% were at least substantially implemented. This contrasts sharply with the assessment in the 1997 Report – presented in the opening paragraph of this paper – that about 40% of countries in the region are very poor compliers.

Although conceptually superior to other measures used in the empirical literature, our prefered measure of compliance has the statistical drawback of entailing a much smaller number of observations. Thus, while the World Bank compliance scores are relative to 163 adjustment operations in Sub-Saharan Africa, the data points are only 35, equal to the number of programme countries. Moreover, these data do not allow a dynamic analysis of compliance. To summarize, our overall view is that the World Bank (1997) data can be used in an empirical study on the determinants of compliance with conditionality in Sub-Saharan African programme countries. These data are, however, far from perfect and therefore any result should be taken with caution.

4. METHODOLOGY

The econometric approach

The problem of determining what affects programme countries' willingness to comply with conditionality can be represented as follows:

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economic performance held at the Royal Institute of International Affairs in London.

$$Z_i^* = \beta_1' x_i + u_{1i} \tag{1}$$

For country *i*, the willingness to comply Z^* is a function of a set of variables *x*. u_1 denotes an error term. Z^* cannot be observed directly. What can be observed – our dependent variable – is a binary variable that crudely separates countries into a group of compliers and a group of poor compliers on the basis of certain behaviour that is assumed to reflect the unobservable willingness to comply. Such binary variable *Z* is defined as:

$$Z = 1 \quad \text{if } Z^* > Z^T \qquad \text{and } Z = 0 \qquad \text{otherwise} \tag{2}$$

where Z^T is the threshold to compliance. We estimate the probability function of compliance *P(Z)*, *that* is: $P\left(Z_i = 1\right) = P\left(Z_i^* > Z_i^T\right)$ by probit. The parameters of *x* are estimated such that the observed results are the most likely outcomes.

The sample period

The treatment of the sample period in this paper warrants some comments. We adopt a cross-sectional approach. The use of panel data is made impossible by the nature of the dependent variable: this is fixed and does not have time-series variation. The sample period for each country is divided into a pre-programme and a programme period, each having a five-year duration. The choice of a five-year adjustment period is the same as that in World Bank (1997) and it is the period over which compliance is measured.

In the evaluation studies of the effectiveness of World-Bank supported adjustment programmes that adopt a cross-sectional approach, the definition of programme and pre-programme periods is the same for all countries. That is, the sample period is selected by identifying a specific date as the beginning of the

adjustment period for all countries. For example, World Bank (1994) fixes the beginning of structural adjustment lending in Africa at 1986. The same procedure is followed in Corbo and Rojas (1992) to investigate both the determinants of participation in World Bank programmes and the effectiveness of these programmes, although they fix the beginning of the adjustment period at 1985.

This approach is clearly inappropriate, since African countries undertook structural adjustment programmes at different times, with some countries completing their operations before other countries had even begun theirs.[4] Thus, in this paper, the sample period varies in accordance with each country's actual adjustment period. This treatment of the sample period is the same as in Noorbakhsh and Paloni (2001).

5. THE DETERMINANTS OF COMPLIANCE

It is important that, to avoid the charge of being ad hoc, the selection of explanatory variables be based as closely as possible on the theory of what might determine compliance, particularly in view of the lack of consensus on a benchmark regression. However, the literature on this topic is in its infancy and proceeds in a rather informal way. Contributions are overwhelmingly from within the World Bank. A number of evaluation reports of adjustment lending address the issue of programme implementation (Jayarajah and Branson, 1995; World Bank, 1988; 1990; 1992; 1997). In addition, Dollar and Svensson (2000) formally analyse the role of political-economy factors as well as factors under the World Bank's direct control. Ivanova *et al.* (2003) concentrate on IMF-supported programmes. Together, all these publications give an insight into the factors that might affect compliance.

Specifically, this literature suggests that a country's compliance with

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4. For example, Malawi took its first adjustment loan in 1981, Burkina Faso in 1991.

conditionality will depend on its implementation capacity, the strength of the short-run results of reforms, political stability and credibility, the occurrence of exogenous shocks, adequate external funding of the reform effort, the initial macroeconomic conditions.[5] Each of these factors can be measured in a variety of ways. In what follows we focus on those particular measures that empirically have given us the most successful regression specification. We refer the reader to Mosley, Noorbakhsh and Paloni (2003) for a full discussion of other conceptually similar variables that, however, provide inferior specifications.

a. Implementation capacity. Jayarajah and Branson (1995) report that inadequate implementation capacity, particularly due to scarce technical and administrative resources, is especially relevant among the Sub-Saharan African countries in explaining poor implementation. This factor is a major constraint when the programme envisages reforms over a wide front simultaneously. Cross-country studies in the economic growth literature have also convincingly highlighted the role of institutional quality for a country's performance (for example, Ritzen, Easterly and Woolcock, 2000). This factor is then likely to be a major determinant of a country's implementation capacity and compliance. Especially in low-income countries, lack of infrastructure and an inadequate institutional framework may be significant obstacles to the response of private investment, without which structural reforms are interrupted or reversed. We used a broad measure of implementation capacity, represented by a

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5. Such literature highlights the role of two further factors, namely, borrower ownership, and monitoring and supervision. The unavailability of data makes the inclusion of these factors unfeasible. Moreover, it could be argued that the operational usefulness of the concept of borrower ownership within the specific context of our research is rather doubtful. In fact, neither Dollar and Svensson or Ivanova *et al.* employ the concept of borrower ownership in their analyses. See Mosley, Noorbakhsh and Paloni (2003) for details.

dummy variable taking value one for low-income countries and zero otherwise.[6]

b. Short-run outcomes. A key task for a government introducing structural reforms is to produce good economic results relatively quickly. A favourable economic environment helps increase the credibility of reforms and sustain adjustment programmes in many ways. For example, the success of some reforms may remove obstacles to others and thus improve the implementation of the whole package, perhaps because success strengthens ownership that is essential for sustained implementation.

Desirable adjustment measures are more likely to be sustained if reasonable economic growth is maintained (World Bank, 1988; 1990). By contrast, the private sector's investment response, which is required to obtain the desired reallocations of resources, is unlikely to be forthcoming in an environment of economic recession and pessimistic expectations. Also, in an expanding economy, it is easier to generate resources for financing investment, government expenditure, and imports, which need to be maintained at certain levels to soften the costs of transition. Painful policy changes are likely to be more acceptable if people think the pain will not last long. Conversely, the failure of the programme to generate adequate and visible benefits quickly can render the adjustment effort socially unacceptable and, by allowing political opposition to consolidate, ultimately unsustainable. We took the rate of growth of real GDP during the adjustment period as the short-run outcome affecting the sustainability of reforms.[7]

c. Political stability and credibility. A relatively stable political environment

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6. We classify as low-income those countries with per capita incomes of $480 or less in 1987, as in World Bank (1989). According to this, six of our programme countries are not low income.

7. Reforms are normally associated with macroeconomic stabilisation and an improvement in the external accounts. However, it could be argued that, even if programmes successfully manage to stabilise the economy and improve the external position, they may not gain the support of the various

during the tenure of the programme may be associated with a higher degree of compliance, since periods of political stability provide a long-range planning horizon for core ministries, thereby ensuring that the momentum of reform is maintained. In contrast, political instability shortens the time horizon of a reforming government, necessitating a quick success of the programme (Jayarajah and Branson, 1995; Webb and Shariff, 1992). If the benefits of the programme are slow to materialize, the commitment to sustain the reform effort may waver according to the increase in political uncertainty or the threat of electoral changes. Moreover, when society is polarized, there may be excessive gradualism in continuing with an already initiated reform (Alesina and Drazen, 1991). Ivanova *et al.* (2003) highlight the role of vested interests in resisting reform. By weakening national ownership, they can be an important factor affecting the implementation of reform programmes.

As there are a number of technical difficulties in using the standard indicators of political economy characteristics in this study, we have employed an economic variable – the change in the gross domestic investment to GDP ratio between the programme and the pre-programme period – to reflect political stability and credibility.[8]

The use of this proxy may be justified by the hypothesis that the private sector's investment response to policy reforms – which is crucial to their success – will only be forthcoming if the private sector believes that structural reforms will be sustained. If reforms are not believed to be sustainable or their future is uncertain, the

stakeholders in society unless they promote economic growth. Our empirical results are consistent with this view.

8. Most of the standard indicators of political economy characteristics are measured either at a specific point in time or as decade averages and are, therefore, ill suited for our analysis where each country has its own sample period. Other indicators, for which yearly data are available – such as the Freedom House indices of political and civil liberties and democracy – are intended to provide comparisons across countries at a given point in time, not across time. Political economy variables are

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private sector will hold back investment and the reforms will be abandoned (Dornbusch, 1991). Expectations about the future of structural reforms will mostly depend on factors such as political stability, government credibility, fairness in the distribution of the expected costs and benefits of reforms, etc. Thus, changes in the investment to GDP ratio are also a reflection of those factors. In the discussion of the econometric results in the next section we will argue that, in the specific context of our regressions, the change in the investment to GDP ratio can indeed be seen as a good proxy for political economy factors.

d. Exogenous shocks. Unfavourable international economic conditions may adversely affect the sustainability of the policy reforms initiated under structural adjustment. In this respect, Webb and Shariff (1992) and World Bank (1990) point out that loans made during the 1980s and early 1990s to countries with stable or improving external circumstances during the loan period had higher average rates of implementation than loans going to countries experiencing serious adverse shocks.

As the Sub-Saharan African programme countries were hit by severe shocks to their terms of trade, especially during the 1980s, we have measured exogenous shocks by the change in terms of trade between the programme and the pre-programme periods.[9]

e. Adequate funding. Adequate external finance gives tangible evidence of external support for pro-reform factions within the government (World Bank, 1992). Moreover, it increases welfare while the programme is being implemented, thus improving the credibility of the reforms and raising confidence in the government's

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also not very robust to alternative econometric specifications. Ivanova *et al.* (2003) for example report that the variables used by Dollar and Svensson (2000) do not work well in their regressions.

9. This particular formulation has the advantage that it captures the occurrence of shocks in the programme period as well as the reversion to 'normal' values after a shock during the pre-programme period.

management. As argued above, a sanguine perception of the sustainability of the adjustment is important in stimulating the investment response. In case of adverse exogenous shocks, the provision of supplementary financial resources is important to cushion the negative effects of the shocks and allow the continuation of adjustment operations (Jayarajah and Branson, 1995). We have used the ratio of adjustment lending commitments to GNP as the indicator of external funding.

f. Initial macroeconomic conditions. In countries that have small initial macroeconomic problems and structural distortions the adjustment process may involve a relatively swift transition to a new growth path, while in countries that start off with more distorted economies and a position of stagnation the adjustment can be expected to take much longer and the implementation of adjustment programmes to be relatively weaker (Jayarajah and Branson, 1995; World Bank, 1988). In these unfavourable circumstances, the immediate objective of a programme is to achieve a sustainable reduction of the fiscal deficit and a competitive real exchange rate, which are seen as preconditions for deeper structural reforms (Webb and Shariff, 1992; World Bank, 1988; 1990). World Bank (1998) and Burnside and Dollar (2000) show that adjustment programmes are more easily implemented and successful when the recipient country's economic policies are sound before external funding is provided.[10]

We have represented the state of initial macroeconomic conditions through the fiscal balance to GDP ratio and the change in the real exchange rate, both measured in the pre-programme period. These variables can also be interpreted as proxies for internal and external (dis)equilibria.

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10. See Tsikata (1999) and McGillivray and Morrissey (2001) for reviews of the effects of aid.

Estimation results

The results of our probit regression for the determinants of compliance are presented in Table 1.

Insert Table 1

The Kullback-Leibler R-squared is 0.70. The constant is not statistically significant and the likelihood ratio test strongly rejects the hypothesis that all coefficients (except the constant) are jointly equal to zero.[11] However, perhaps due to the small sample size, the standard errors for some of the estimated coefficients are relatively large. Nevertheless, all have the expected signs and are statistically different from zero at moderate confidence levels.

The results have a sensible interpretation. The factors discussed in Section Five that can theoretically be expected to affect programme implementation have turned out to be empirically important too. Low-income countries (*LIdum*) have a low implementation capacity and are less likely to comply. The probability of compliance increases in a more favourable economic environment: a good growth performance of the domestic economy during the programme (higher GDP rate of growth *gY*) and improvements in terms of trade between the pre-adjustment and the adjustment period (higher *dTT*) are positively associated with compliance. An increase in the investment to GDP ratio between the programme and the pre-programme period (*dIY*) is another factor making compliance more likely. Interestingly, the fact that both GDP growth

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11. The log-likelihood ratio test statistic is equal to 37.54. This is distributed as a Chi-square with 7 degrees of freedom. The critical value at the 1 percent level of significance is 18.48.

and the investment ratio are significant at the same time suggests that the increase in the investment ratio is not simply a proxy for economic recovery and could reflect the influence of other factors, such as a good degree of political stability and credibility of the reform programme. Adequate funding – adjustment lending commitments to GNP *ALY* – increases the probability of compliance. A larger adjustment lending package softens the costs of adjustment and increases the chances that countries would strive to comply with policy conditions, perhaps also a reflection of stronger borrower ownership. Compliance is less likely the greater the initial macroeconomic distortions (i.e. the greater the appreciation of the real exchange rate and the larger the budget deficit in the pre-programme period – lower $gRER_{-1}$ and FBY_{-1}). This result echoes the finding by Burnside and Dollar (2000) that reform is more likely to be successful in countries with good policy environment and macroeconomic stability before the programme. Thus, although countries enter an adjustment programme most often in the wake of an economic crisis, this finding suggests that it would not be necessarily the case that, the more serious the crisis, the higher the degree of compliance that could be expected.

The issue of endogeneity and reverse causality

Though interesting, these empirical results could be biased due to endogeneity and reverse causality. This problem may concern three of our regressors, namely, lending commitments, GDP growth and investment changes. It could be argued that loans are more easily extended to countries that are expected to comply and, in these countries, economic growth and investment are higher.

On theoretical grounds we would expect the bias resulting from ignoring this problem to be not particularly large. For a start, one may note that World Bank-

supported adjustment operations could not be regarded but a success if countries that complied with World Bank conditionality grew faster, had higher investment and received more loans. The debate in the literature about the shortcomings of structural adjustment is an indication that compliance is unlikely to be the driving force behind growth, investment and lending decisions simultaneously.

Whether the expectation of compliance is a determinant of World Bank lending and its importance relative to that of other factors are matters on which there is very little empirical evidence. Moreover, some literature convincingly suggests that lending decisions are broadly independent of the recipients' compliance records. For example, Dollar and Svensson (2000) and Collier *et al.* (1997) argue that conditionality has in practice been used as instrument to induce governments to reform. In this context, loan size would be adjusted, for example, according to the recipients' needs, as determined by the causes of the difficulties facing the country and the extent of the required adjustment. The literature that we have reviewed in section Three highlights factors such as the importance of Bank officials' private and institutional vested interests or the role of broader political considerations in influencing lending decisions. The very motivation for the emergence of the selectivity approach to policy-based lending is precisely the fact that the World Bank has lent to uncommitted reformers. In this respect, it should be noted that Dollar and Svensson (2000) treat loan size as independent of compliance in their paper. To summarize, our expectation – which is tested below – is that, while lending commitments have many determinants other than recipients' compliance, there are theoretical arguments – reviewed in section 5.*e*. – that loan size may improve

compliance.[12]

In contrast to the case of lending decisions, there is a vast amount of empirical literature that shows that both economic growth and investment are affected by government policies. Therefore, one could suspect that compliance with conditionality might be a determinant of those economic outcomes. Nevertheless, even in this case, the bias from ignoring endogeneity and reverse causality may be relatively small.

One possible argument is based on the slow speed of supply responses, particularly in developing countries. Structural reforms (compliance) are then likely to have not contemporaneous but lagged effects on growth and investment. Not only does it take time to implement structural reforms, there is also a significant lag before reforms produce effects on intermediate and final objectives. For example, trade reforms will take some time before they have an impact on actual trade volumes and patterns and an even longer time before these will affect growth. In fact, since our data are five-year averages, it is probable that the latter years in the sample may just pick up the beginning of the positive effects of compliance on the economy. It should also be noted that, even in Sub-Saharan Africa, World Bank loans amount to only a relatively small fraction of aggregate investment (Krueger, 1998).

A second argument is based on the political economy literature. This has now produced a number of convincing explanations for the paradox that even reforms that *ex post* would be seen as beneficial may fail to gain popular support during implementation. This shortens the planning horizon of a pro-reform government and,

12. This does not imply that lending by itself would always improve compliance. We only make the weaker – and to some extent obvious – point that pro-reform governments are strengthened by adequate funding because funding softens the costs of adjustment and makes reforms more credible.

despite the fact that over the long run reforms would raise welfare for the majority, reforming governments would periodically reassess the situation and wait for the realization of certain economic variables – such as growth and investment, for example – before deciding whether to continue with the reform programme. We have discussed the importance of positive economic results for the sustainability of reforms in section 5.*b*. and the role of political stability in section 5.*c*. Thus, our expectation – which we are going to test – is that while the short-run effects of compliance on growth and investment are most likely small, those of growth and investment on compliance can be expected to be quite large.

Although endogeneity and reverse causality may have biased the results presented in Table 1, for the reasons mentioned above we believe the bias to be probably small. Nevertheless, a bias is a bias and its extent should be rigorously investigated. An appropriate procedure suggested in the econometric literature to deal with the problem of endogeneity and reverse causality in a probit regression is the two-stage technique proposed by Heckman (1978) and Nelson and Olson (1978). If the true model is not represented by equation (1) above but by

$$Z_i^* = \beta_1' x_i + \beta_2' y_i + u_i \tag{3}$$

where the probability of country *i* complying is a function not only of a set of exogenous variables x_i but also of a set of endogenous variables y_i, then the first step in the Heckman procedure consists in estimating the exogenous component of the endogenous variables, i.e. the component unaffected by compliance. Thus, one specifies a set of equations (one for each endogenous variable) of the form:

$$y_i = \gamma_1' h_i + v_i \tag{4}$$

where the variables h_i on the RHS of the equations are not functions of compliance. The second stage in the procedure consists in plugging the fitted values from the estimation of (4) into (3), i.e.:

$$Z_i^* = \beta_1' x_i + \beta_2' \hat{y}_i + u_i \tag{5}$$

and estimating (5) by probit.

To organize the discussion, it may be useful to distinguish between Bank-based endogeneity – which concerns the lending commitment variable – and recipient-based endogeneity – which concerns the growth and investment variables – as they require different modelling criteria. In the case of Bank-based endogeneity, we regress the lending commitment to GNP ratio on various indicators of recipient's needs as well as an indicator of broader political considerations that might affect Bank lending decisions. The results are reported in column (1) in appendix C.

Countries with larger current account deficits (lower CAY_{-1}) and higher public and publicly guaranteed foreign debt service ($GDSX_{-1}$) receive bigger World Bank loans. Greater adjustment lending is extended to countries with lower per capita income (YPC_{-1}), a less developed financial system – proxied by the broad money to GDP ratio (MY_{-1}) – greater dependence on foreign imports (ZY_{-1}), greater seigniorage (SEY_{-1}) – which reflects a less developed tax system and may be associated with higher inflation – and poorer infrastructure – proxied by the percentage of paved roads ($ROAD$). World Bank lending decisions are also significantly affected by the provision of IMF loans ($IMFY_{-1}$), which could reflect broader political considerations.[13]

For the case of recipient-based endogeneity, assume first that, for each

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13. The significance of the IMF variable is unlikely to represent a country's external disequilibria, since variables of external disequilibria are included in the regression and are significant.

country, growth and investment (y_k) are determined as standard by the following functions:

$$y_k = \alpha + \gamma \, p + \eta W + v_k \qquad (6)$$

where p is a vector of policy instruments, W is a vector of world variables and other exogenous variables, v_k is the stochastic term, γ and η are the appropriate parameter vectors. Equation (6) cannot be estimated in its present form, since policies p are obviously affected by compliance while, as shown by equation (4), the application of the Heckman procedure requires the inclusion exclusively of policies unaffected by compliance. To resolve this problem, we posit the existence of J policy reaction functions expressing how each policy instrument p_j changes when the state of the economy changes:[14]

$$\Delta p_j = \lambda \left[y^d - y_{-1} \right] + \varepsilon_j \qquad (7)$$

where y^d is a vector of the desired values of target variables, λ a parameter vector and ε_j the stochastic term. Each reaction function states that the change in a policy instrument j is a function of the difference between the desired values of possibly a number of target variables this period and their actual values last period. Solving (7) for all policy instruments in vector p and plugging this into (6) one obtains:

$$y_k = \delta - \gamma \Lambda \Theta y_{-1} + \gamma \Omega p_{-1} + \eta W + \omega_k \qquad (8)$$

Λ is a matrix where each row contains the parameter vector λ relative to a specific policy instrument – from equation (7). $\delta = \alpha + \gamma \Lambda y^d$ and $\omega_k = v_k + \gamma \varepsilon_k$. The desired values of target variables are thus included into the constant. Equation (8) shows that

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Moreover, it has been argued that geo-political considerations are among the most important determinant of IMF lending, see Barro and Lee (2001).

14. For meaningful results to be obtained it is a sufficient condition that the deviations in the reactions of instruments to targets should be random across time and across countries. Reaction functions like (7) have the same form as those in the so-called Modified Control Group Approach, which is used to assess programme effectiveness (Goldstein and P. Montiel, 1986).

the outcome variables y_k are a function of lagged values of policy instruments, lagged values of the various target variables that affect policy instruments, world variables and other exogenous variables. Θ and Ω are diagonal matrices with diagonal elements equal to one or zero, which allow the inclusion of different target variables and policy instruments in each equation, if significant.[15] We estimate output growth and the investment to GDP ratio during the adjustment period using the specification given in (8). The results are presented in columns (2) and (3) in appendix C.

Output growth is positively affected by expansionary increases in government consumption ($gGCY_{-1}$) and greater financial development (MY_{-1}). More favourable terms of trade (TT_{-1}), a lower foreign debt burden (DY_{-1}) and stronger growth of the world economy (gWY) are also significant factors that improve a country's economic performance. On the other hand, the occurrence of droughts (DRY) and the growth of non-economically active population ($gNEAP$) slow down output growth.

The aggregate investment to GDP ratio rises with increases in domestic credit to the private sector ($DCPY_{-1}$) and claims on the government and other public entities ($CLGY_{-1}$).[16] A greater access to foreign imports (gZY_{-1}) – perhaps a reflection of the dependence of domestic investment on imported intermediate inputs – raises investment but a larger foreign debt burden (DY_{-1}) lowers it. The investment ratio is also higher in a more propitious business environment – as proxied by (the log of) the lagged investment ratio (LIY_{-1}).

The adjustment lending, output growth and investment ratio regressions give

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15. This is reminiscent of the Modified Control Group approach proposed by Goldstein and Montiel (1986) and its extended version implemented by Noorbakhsh and Paloni (1998), which nests the Modified Control Group as a special case when all the diagonal elements of Θ and Ω equal to one.

16. The latter result does not require any assumption concerning the complementarity between government and private investment. The positive effect of higher claims on the government for aggregate investment simply reflects that government investment is likely to increase when such claims are larger.

sensible results. The success of these regressions is particularly encouraging in view of the structure of the sample period used here, with actual adjustment and pre-adjustment periods. The results of the probit estimation of equation (5), where the fitted values from these regressions replace their actual values, are reported in Table 2.[17] Interestingly, the significance of all the explanatory variables, including those corrected for endogeneity, is similar to that reported in Table 1, confirming that endogeneity had not given rise to a large bias.

Insert Table 2

Classification performance of the model

To evaluate the classification performance of the model, we examine the ability of our estimated probit regression (from Table 2) to correctly assign countries to the categories of compliers and non-compliers. In Table 3 the predicted numbers of compliers and poor compliers are set against the observed frequency of these cases. As can be seen from the first row of this table, the probit regression correctly predicts 24 of the 26 cases considered: this gives an accuracy ratio of 92.3 percent.[18] This regression shows one 'false positive' (prediction of compliance when in fact there was poor compliance) and one 'false negative' (prediction of poor compliance when the country complied). The countries concerned are Chad and Burkina Faso, respectively. It may be noted that Burkina Faso has been classified by the 1997 World Bank Report as a weak complier: this is a point we shall return to later.

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17. The fitted values of the change in the investment ratio between adjustment and pre-adjustment are calculated by taking the antilog of the fitted value of the investment ratio regression and subtracting the investment ratio in the pre-adjustment period.

18. Knight and Santaella (1997) argue that this measure is analogous to the R-squared in standard regressions.

Insert Table 3

The forecasting performance of the model can also be assessed by focusing on the precision of forecasts. The *Cut Value* for Table 3 is 0.5; that is, all cases which have been predicted to have a value greater than 0.5 (to 1) are classified as compliers and all those with the predicted value of less than 0.5 (to 0) are regarded as poor compliers. The more these two groups are away from the mid-point and cluster at their respective ends the higher is the precision of the estimated model. Figure 1 reveals a high precision for the estimated model. All correctly predicted compliers but one have a probability between 0.9 and 1 while the probability of the poor compliers complying falls, with one exception, between 0 and 0.1. We interpret the accurate forecasting performance of the model as additional evidence that the estimated model is quite successful in explaining compliance with conditionality.

Insert Figure 1

The issue of robustness

Given the small size of our sample it is important to address the issue of robustness of our econometric results. We have checked the sensitivity of our results to different estimation methods as well as a different sample composition. As explained in section Four, the probit model is based on the assumption that the error term is normally distributed. If, alternatively, the cumulative distribution of the error term is logistic, we have the logit model. Thus, we have estimated the probability function of

compliance by logit regression.

Although the logistic distribution is similar to the normal except in the tails, probit and logit models may give different predictions the more the sample is unbalanced between compliers and non-compliers (Greene, 1997). Given the composition of our sample, the logit model can provide some indication of the robustness of our results.

The results of the logit regression, reported in Table 4, confirm the findings from the probit regression.[19] The estimated coefficients are statistically different from zero at levels of confidence that are similar to those of the probit regression and the forecasting power of the regression has an accuracy rate of 92.3 percent, classifying 24 out of 26 cases correctly (second row in Table 3). Like in the probit model, Chad and Burkina Faso are misclassified.

Insert Table 4

An alternative method for the investigation into the determinants of compliance is discriminant analysis. This is widely regarded as the main competitor to probit and logit for classification purposes (Kennedy, 1998). In discriminant analysis, a linear combination of explanatory variables is used to create scores D that distinguish between the two groups of compliers and non-compliers:

$$D = B_0 + B_1 X_1 + B_2 X_2 + \ldots + B_p X_p \tag{9}$$

The linearity of the discriminant function as an alternative to the non-linear format of the logit and probit models is particularly interesting, since it results in a different form of modelling the same set of explanatory variables. The classification results are

reported in Table 3 (penultimate row) and the estimated coefficients in appendix D (columns 1-3). The estimated discriminant function quite successfully forecasts the tendency of countries to comply or not to comply with the conditions attached to their loans. Twenty-three countries are classified correctly: the accuracy ratio is 88.5 percent. The three misclassified countries are: Chad (a poor complier); Ghana (a good complier) and Zimbabwe (a weak complier).

Insert Table 5

We have also checked the robustness of our results to a different composition of our sample. More precisely, we have excluded the countries that the World Bank (1997) classifies as weak compliers from the sample and repeated discriminant analysis on a sample which includes only the good and the poor compliers.[20] There are two motivations for this experiment. One is based on the technical shortcomings of the index of compliance discussed in section Three, which could result in an arbitrary classification of countries. This problem is particularly acute with respect to the weak compliers, especially since so far we have included these countries in the group of compliers. It could be argued that some of these countries should have been more appropriately put together with the non-compliers. Thus, our results could be vitiated by the misclassification of weak compliers in the dependent variable. The second motivation for our experiment is that, indeed, probit, logit and discriminant analysis have all incorrectly predicted the group membership of some weak compliers. The experiment of excluding these countries from the sample is in effect

19. In this and in subsequent analyses we have used *ALYfitted*, *gYfitted* and *dIYfitted* in place of their actual values.

asking whether the variables identified as determinants of compliance are able to discriminate between the polarized groups of good and poor compliers, which is a minimum requirement if our results are to be taken seriously.

The classification results are reported in Table 3 (last row), estimated coefficients in Appendix D (columns 4-6). The accuracy of the predicting equation has now increased to 94.1 percent. There is only one misclassified country, namely, Chad and all compliers are correctly classified (including Ghana, which was misclassified when discriminant analysis was conducted on the full sample).[21] Overall, we interpret the outcome of these robustness checks as supportive of our contention that we have identified a set of variables that affect the likelihood of programme countries' compliance with conditionality and can be regarded as determinants of compliance.

7. CONCLUSIONS AND POLICY IMPLICATIONS

This paper, which aims to explain Sub-Saharan African programme countries' compliance record, has been motivated by our unease with the results of recent research on the factors affecting the success of policy-based lending. Our empirical results highlight the role of a country's income status, economic performance and political stability during the programme, the external economic environment, the size of financial support for the reform programme, and initial macroeconomic conditions.

The importance of these results should not be seen only in the confirmation of the relevance of the many factors that the theoretical literature puts forward as possible determinants of compliance. This is not to deny that such confirmation is a

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20. Given the size of the resulting sample, discriminant analysis is more suited for this experiment than probit or logit.

valuable contribution. Indeed these results have implications for the design of conditionality. For example, the finding that good economic performance makes compliance more likely could entail that programmes should pay more attention to economic growth even in the short run so that adjustment is no longer associated with protracted stagnation.

The main contribution of this paper in our view should be seen in the context of the debate about the selectivity approach to policy-based lending. Our empirical results show that a major determinant of compliance is a country's income status, which could reflect a low quality of institutions. On the assumption that World Bank programmes can only have a very limited impact on institutional quality, this finding is consistent with the policy recommendation of selectivity.

However, our empirical results strongly suggest that compliance is not exclusively determined by exogenous factors, which the World Bank cannot influence, and that the design of conditionality can play a crucial role by making the programme more appropriate to the prevailing conditions of individual countries. It is instructive to highlight some of the differences between our results and those of the empirical research conducted by Dollar and Svensson (2000) and Ivanova *et al.* (2003).

Both papers find that macroeconomic conditions prior to reform do not matter for the successful implementation of programmes. Dollar and Svensson justify this result by arguing that macro policy variables in the pre-programme period (they use inflation and fiscal balance) may be driven by the same socio-political variables that affect the likelihood of programme success. Ivanova *et al.* suggest that the initial conditions could be uncorrelated with implementation because the Fund's

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21. In the polarized sample, membership is almost equally spread between the two groups,

programmes are tailored to the circumstances of each member country and the programme targets incorporate realistic goals.

In contrast with these authors we find that initial macroeconomic conditions affect programme implementation. Our interpretation of this finding is that, when the economic crisis is serious and the required adjustment large, conditions in the programme may have tended to make the adjustment too harsh with a consequent breakdown in compliance. The speed of reforms may have been too fast or reforms may have been sought in too many areas. We think that ours is overall a much more credible finding. It also draws support from other World Bank's research. Jayarajah and Branson (1995), Webb and Shariff (1992), and World Bank (1998) all suggest that conditionality may have been too wide ranging. World Bank (1997) specifically mentions over-ambitiousness and inappropriate sequencing of reforms as the main reasons for poor programme design.

Dollar and Svensson emphasise the importance of *ex ante* political economic characteristics that are independent of the programme. They conclude that all donors should do is to "take as largely given the probability that the reform will be carried through" (p. 913) and identify the likely reformers. Ivanova *et al.* confirm Dollar's and Svensson's main message with their finding that country compliance is only explained by a small number of domestic political economy factors.[22] It is striking that, while using two-stage estimation to deal with the endogeneity of a number of other variables, these authors should treat their main policy variables as exogenous. More precisely, Dollar and Svensson and Ivanova *et al.* consider political instability

with nine compliers and eight non-compliers.

22 . In an earlier version of their paper, Ivanova *et al.* (2001) comment their econometric results with the uncompromising statement that "whether a programme succeeds or not lies entirely on the shoulders of country authorities" (p. 21). In the 2003 version the text has been somewhat toned down despite the econometric results being the same.

during the implementation of the programme as exogenous. Ivanova *et al.* take the strength of special interests as exogenous, while at the same time citing Olson (1982, 1993), who highlights that special interests opposing welfare-improving change arise endogenously in the reform process.

This is much more than a pure technical point. Treating government crises and special interests' opposition as exogenous and then arguing that reform success is exclusively a function of exogenous political-economy factors within the country attempting to reform is what allows these authors to advocate selectivity as the overriding principle in policy-based lending. In our paper, the change in the investment ratio (which we argue represents political stability and other political economy factors) and the rate of economic growth during the programme turn out to be determinants of the decision to comply with conditionality. The simple recognition that these factors are affected by the short-run impact of reforms, with obvious consequences for their sustainability and ultimate success, immediately brings the design of the reform programme and the quality of the policy advice under investigation.

Our results show that the initial effects of programmes are crucial for the willingness to continue with the reforms and logically suggest that political stability or opposition to reforms may well be the product of the modality of reforms, i.e. the pattern of budgetary and macroeconomic adjustment, the speed of reforms, their extent and their sequence (Mosley, 2001). Thus, the design of adjustment programmes is at least as important as the identification of politically stable countries. In its reports on lending operations in Sub-Saharan Africa, the World Bank (1995, 1997) stresses the need for better design of adjustment operations, particularly with respect to ambitiousness and sequencing of reforms. Programme countries' commitment to

reform can only be expected when the reforms are consistent with implementation capacity, which implies that countries with different implementation capacity may require reforms with different characteristics. Particular sequencing of reforms makes a difference because the outcome of reforms has an effect on the capacity to persist with the reforms and implement new ones.

To conclude, the empirical results presented in this paper contradict the evidence underpinning the selectivity approach to policy-based lending. While in practice more selectivity may be required in certain cases, this should not become the overriding principle in policy-based lending. The economic literature has highlighted a number of practical problems with a rigid adoption of selectivity (IMF, 2001). There are also many implications both for recipients and donors which have perhaps received less attention, such as the fact that aid budgets may be underspent, for example. These are issues that deserve further investigation but fall outside the scope of this paper.

Here we have focused on the determinants of policy reform implementation and found that some of these are not beyond the World Bank's influence. In other words, there is room for improving the quality of policy advice and, with it, the allocation of resources. To paraphrase Dollar and Svensson, the role of donors cannot be reduced to only identifying reformers. Although our results are interesting and sensible they are tentative, as our empirical analysis has a number of limitations. We have a small sample, the explanatory variables are rather indirect proxies for the concepts that they are intended to represent and the dependent variable is an imperfect measure of programme implementation. Moreover, our results may be specific to Sub-Saharan Africa. Thus, much more work needs to be done to evaluate the robustness of the policy implications discussed in this paper. This was but the beginning: the

research agenda is long.

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Compliers (full sample case)

Benin, Burkina Faso, Cote d'Ivoire, Gambia, Ghana, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Senegal, Sierra Leone, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Compliers (polarized sample case)

Benin, Gambia, Ghana, Malawi, Mali, Mauritania, Mozambique, Sierra Leone, Tanzania.

Poor compliers

Burundi, Cameroon, Central African Republic, Chad, Congo, Gabon, Nigeria, Rwanda

Equatorial Guinea, Guinea, Guinea-Bissau, Kenya, Mauritius, Sao Tome, Somalia, Sudan, Zaire have been excluded from the sample due to lack of data.

[†]The group of poor compliers is the same as in World Bank (1997). The group of compliers includes good and weak compliers in the full sample case and only the good compliers in the polarized sample case.

a) Variables used in compliance regressions

LIdum   Dummy for low-income countries. 1: Low income; 0 otherwise. Original data source: World Bank, *World Development Report* (New York: Oxford University Press, 1989)

gY   Real GDP growth in the adjustment period.

dIY   Change in the gross domestic investment to GDP ratio between the adjustment and the pre-adjustment periods.

dTT   Change in barter terms of trade between the adjustment and the pre-adjustment periods.

The source of data for *gY*, *dIY* and *dTT* is: World Bank, *World Development Indicators*, 1997 CD.

ALY   Adjustment lending commitments to GNP. Source: World Bank, "Adjustment Lending in Sub-Saharan Africa: An Update," Report no. 16594 (Operations Evaluation Department, Washington D.C., 1997)

gRER$_{-1}$ Growth in the real exchange rate during the pre-adjustment period. We have defined the exchange rate as the domestic price of foreign currency. Source: IMF, *International Financial Statistics* and L. Bouton, C. Jones, and M. Kiguel, "Macroeconomic Reforms and Growth in Africa: *Adjustment in Africa* Revisited," (World Bank, Macroeconomics and Growth Division, Policy Research Department, Washington D.C., 1994)

FBY$_{-1}$ Fiscal balance to GDP ratio in the pre-adjustment period. Source: M. Bruno and W. Easterly, "Inflation Crises and Long-Run Growth," *Journal of Monetary Economics* 41 (1998): 3-26; and World Bank, *African Development Indicators*

gYfitted, dIYfitted, ALYfitted are the fitted values of *gY*, *dIY* and *ALY* respectively, obtained from the regressions reported in Appendix C.

b) Variables used in other regressions only

CAY$_{-1}$ Current account balance to GDP ratio in the pre-adjustment period

GDSX$_{-1}$ Public and publicly-guaranteed foreign debt service to export ratio in the pre-adjustment period

IMFY$_{-1}$ Use of IMF credit to GDP ratio in the pre-adjustment period

YPC$_{-1}$ Per capita GDP in the pre-adjustment period

MY$_{-1}$ M2 to GDP ratio in the pre-adjustment period

SEY$_{-1}$ Seigniorage to GDP ratio in the pre-adjustment period

ZY$_{-1}$ Real imports to GDP ratio in the pre-adjustment period

gZY$_{-1}$ Growth in real imports to GDP ratio in the pre-adjustment period

gGCY$_{-1}$ Growth in real government consumption to GDP ratio in the pre-adjustment period

gNEAP   Growth in non-economically active population in the adjustment period

TT$_{-1}$ Barter terms of trade in the pre-adjustment period

DY$_{-1}$ Foreign debt to GNP ratio in the pre-adjustment period

gWY   Growth in world real GDP in the adjustment period

DCPY$_{-1}$ Domestic credit to the private sector to GDP ratio in the pre-adjustment period

CLGY$_{-1}$ Claims on governments and other public entities to GDP ratio in the pre-adjustment period

LIY   Log of gross domestic investment to GDP ratio in the adjustment period

DRY   Dummy for drought. It is equal to 1 if food production per capita growth is less than 0; it is 0 otherwise.

   The variables have all been abstracted/computed from World Bank, *World Development Indicators*, 1997 and 1998 CDs.

ROAD   Paved road as a percentage of total, decade average in 1980s. Source: W. Easterly and R. Levine, "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics* 112 (1997): 1203-1250. The data for Chad , missing in this data set, have been computed from World Bank, *World Development Indicators*, 1997 CD.

Dependent variable:	ALY	Dependent variable:	gY	Dependent variable:	LIY
CAY_{-1}	-0.171 (-5.018)**	$gGCY_{-1}$	7.244 (3.377)**	LIY_{-1}	0.674 (7.734)**
$GDSX_{-1}$	12.814 (4.856)**	MY_{-1}	0.093 (7.332)**	$DCPY_{-1}$	0.010 (3.860)**
$IMFY_{-1}$	13.055 (3.965)**	$gNEAP$	-1.940 (-10.911)**	$CLGY_{-1}$	1.281 (4.065)**
YPC_{-1}	-0.188E-03 (-1.846)†	TT_{-1}	0.025 (2.620)*	DY_{-1}	-0.267 (-3.558)**
MY_{-1}	-0.071 (-2.064)*	DY_{-1}	-0.482 (-1.959)†	gZY_{-1}	1.118 (2.486)*
SEY_{-1}	0.567 (4.520)**	gWY	1.306 (4.305)**	$Constant$	0.765 (3.231)**
ZY_{-1}	5.017 (1.913)†	DRY	-1.676 (-5.260)**		
$ROAD$	-0.098 (-4.518)**	$Constant$	-5.104 (-4.163)**		
$Constant$	0.388 (0.600)				
				R^2	0.841

t-values are in parentheses. Definitions of variables and data sources are in appendix B. Due to departures from the normality assumption, the Least Absolute Deviations (LAD) estimator has been employed in both the lending commitment and the output growth regressions. For the investment ratio regression, a semi-logarithmic specification with the log of the investment ratio as the dependent variable has been used due to detected non-linearity.

** , * , † denote significance at the 1, 5, 10 percent level respectively.

Variable	Full sample			Polarized sample		
	Unstandardized coefficients (1)	Standardized coefficients (2)	Structure coefficients (3)	Unstandardized coefficients (4)	Standardized coefficients (5)	Structure coefficients (6)
ALYfitted	0.488	0.933	0.558	0.527	0.973	0.585
dTT	0.028	0.510	0.469	0.014	0.233	0.511
gRER$_{-1}$	0.048	0.504	0.094	0.018	0.218	-0.055
dIYfitted	0.064	0.429	0.252	0.108	0.715	0.341
gYfitted	0.187	0.506	0.174	0.053	0.171	0.068
FBY$_{-1}$	0.102	0.426	0.017	0.120	0.525	0.154
LIdum	-0.075	-0.029	0.367	-0.073	-0.026	0.481
Constant	-0.641	—	—	-0.546	—	—

Definitions of variables and data sources are in appendix B. Unstandardized coefficients are the multipliers of the variables when they are expressed in the original units. Standardized coefficients – when the variables are standardized to a mean of 0 and a standard deviation of 1 – measure the contribution of the variables to the discriminant score. However, the size of the coefficients is affected by correlations among variables. To the contrary, the structure coefficients are simply bivariate correlations and are not affected by the relationships among the variables.

Probit regression results

Variable	Coefficient	Standard error	t-statistics	Level of significanc	Marginal Effects
LIdum	-5.581	3.208	-1.740	0.082	-0.552
gY	1.135	0.713	1.592	0.111	0.112
dIY	0.299	0.181	1.650	0.099	0.030
dTT	0.119	0.067	1.767	0.077	0.012
ALY	3.327	1.596	2.084	0.037	0.329
gRER$_{-1}$	0.257	0.137	1.878	0.060	0.025
FBY$_{-1}$	0.546	0.360	1.519	0.129	0.054
Constant	0.196	2.465	0.080	0.937	0.019

Definitions of variables and data sources are in appendix B. The marginal probit coefficients are calculated at the means.

TABLE 2.

Two-stage probit regression results

Variable	Coefficient	Standard error	*t*-statistics	Level of significanc	Marginal Effects
LIdum	-6.505	3.737	-1.741	0.082	-0.480
gYfitted	1.256	0.705	1.781	0.075	0.093
dIYfitted	0.325	0.193	1.682	0.092	0.024
dTT	0.103	0.055	1.888	0.059	0.008
ALYfitted	3.739	1.634	2.289	0.022	0.276
gRER$_{-1}$	0.276	0.137	2.012	0.044	0.020
FBY$_{-1}$	0.579	0.382	1.516	0.130	0.043
Constant	-0.247	2.915	-0.085	0.932	-0.018

Definitions of variables and data sources are in appendix B. The marginal probit coefficients are calculated at the means.

TABLE 3.

Accuracy of the predicting regressions.

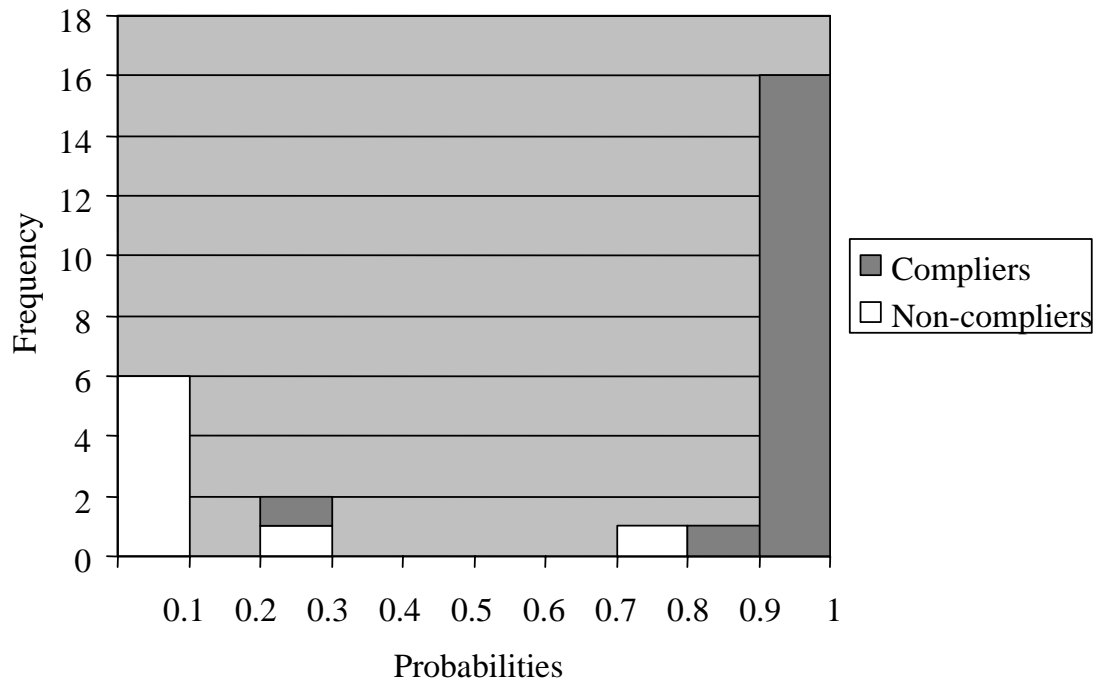| Regressions	Predicted Compliance			Predicted No compliance			Overall percent correct
	Observed Compliance	Observed No compliance	Percent correct	Observed No compliance	Observed Compliance	Percent correct	
Probit	17	1	94.4	7	1	87.5	92.3
Logit	17	1	94.4	7	1	87.5	92.3
Discriminant:							
Full sample	16	9	94.1	7	2	77.8	88.5
Polarized sample	9	1	90.0	7	0	100.0	94.1

FIGURE1.
Histogram of predicted probabilities

TABLE 4.

Logit regression results

Variable	Coefficient	Standard error	*t*-statistics	Level of significance	Marginal Effects
LIdum	-11.024	6.839	-1.612	0.107	-0.467
gYfitted	2.153	1.312	1.641	0.101	0.091
dIYfitted	0.556	0.356	1.563	0.118	0.024
dTT	0.176	0.102	1.723	0.085	0.007
ALYfitted	6.331	3.042	2.081	0.037	0.268
gRER$_{-1}$	0.472	0.256	1.840	0.066	0.020
FBY$_{-1}$	0.993	0.682	1.457	0.145	0.042
Constant	-0.375	5.316	-0.071	0.944	-0.016

Definitions of variables and data sources are in appendix B. The marginal logit coefficients are calculated at the means.