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Aid, Shocks, and Growth

Paul Collier
Jan Dehn

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Summary findings

Analysis of the relationship between aid and growth by Burnside and Dollar found that the better a country's policies, the more effective aid is in raising growth in that country. But this result has been criticized for being sensitive to choice of sample and for neglecting shocks.

Collier and Dehn incorporate export price shocks into the analysis of aid's effect on growth. They construct export price indices using the approach pioneered by Deaton and Miller. They locate shocks by differencing the indices, removing predictable elements from the stationary process, and normalizing the residuals. Extreme negative shocks are the bottom 2.5 percent tail of this distribution.

Introducing these extreme shocks into the Burnside-Dollar regression, the authors find that they are highly significant: unsurprisingly, extreme negative shocks reduce growth. Once these shocks are included, the Burnside-Dollar results become robust to choice of sample. Moreover, the adverse effects of negative shocks on growth can be mitigated through offsetting increases in aid. Indeed, targeting aid to countries experiencing negative shocks appears to be even more important for aid effectiveness than targeting aid to countries with good policies. But the authors show that, overall, donors have not used aid for this purpose.

This paper—a product of the Office of the Director, Development Research Group—is part of a larger effort in the group to assess the impact of aid. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Audrey Kitson-Walters, room MC3-304, telephone 202-473-3712, fax 202-522-1150, email address akitsonwalters@worldbank.org. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The authors may be contacted at pcollier@worldbank.org or jandehn@yahoo.com. October 2001. (21 pages)

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1. Introduction

Aid is a scarce resource, which needs to be allocated to maximum effect as part of global efforts to reduce poverty. Recently, an 'aid effectiveness' literature has developed which investigates quantitatively the criteria by which aid should be allocated. Burnside and Dollar (2000) find that aid is more effective in increasing growth the better is macroeconomic policy. Collier and Dollar (2001) incorporate differences in poverty into the analysis and solve for a 'poverty-efficient' allocation of aid across countries. Such an allocation equates the marginal efficiency of aid in reducing poverty across recipients, aid absorption being dependent both on the incidence of poverty and the level of policy.

Two potentially important weaknesses in this analysis are its sensitivity to choice of sample, and is its omission of shocks. Hansen and Tarp (2001) show that the original Burnside and Dollar result is not robust to the inclusion of cases which Burnside and Dollar discard as outliers. Guillaumont and Chauvet (2001) argue that negative terms of trade shocks have adverse consequences for growth, and that the omission of such shocks may result in an exaggerated effect of policy.

Many small developing countries are indeed highly shock-prone. Case studies of terms of trade shocks such as those collected in Collier and Gunning and associates (1999) conclude that negative shocks have substantial adverse consequences for growth. This is supported by large-sample econometric analysis: Dehn (2001) finds that for 56 developing countries over the period 1970-93 negative terms of trade shocks have long term effects on output. If shocks have effects on growth, their omission from the analysis of aid effectiveness is potentially problematic. If macroeconomic policy deteriorates during shocks, potentially the result that aid is more effective the better is macroeconomic policy is spurious: policy might simply be proxying shocks. In this case the Collier-Dollar aid allocation formula would be misleading. Further, aid might be effective in ameliorating the effect of shocks. In this case the Collier-Dollar formula would be inadequate: a poverty-efficient aid allocation formula would need to take shocks into account.

The main difficulty in introducing shocks into the analysis of aid effectiveness is that the level of economic activity is evidently endogenous to both policy and aid. Hence, shocks need to be measured in such a way that they are unambiguously exogenous. The innovation of the present paper is to incorporate shocks into the aid-growth relationship following the approach of Deaton and Miller (1995), whereby shocks are measured by an index of export prices. Section 2 discusses of our measure of shocks. In Section 3 we incorporate shocks into the Burnside-Dollar model of aid and growth. We first test for whether their results are robust to the inclusion of shocks, and then investigate whether aid ameliorates the effect of shocks. Section 4 considers the implication of the results for aid allocation.

2. Measuring Commodity Price Shocks

In order to examine the effects of commodity price shocks, we evidently need a commodity price index. Our index follows the geometrically weighted structure of the index used by Deaton and Miller (1995):

$$DM = \prod_i P_i^{W_i} \qquad [1]$$

where W_i is a weighting item and P_i is the dollar international commodity price for the commodity i. Dollar prices measure *cif* border prices. Historical *fob* prices, which give a preferable measure of the value of a commodity to the exporting country, are not generally available. The weighting item, W_i, is the value of commodity i in the total value of all commodities, n, for the constant base period j:

$$W_i = \frac{P_{ji} Q_{ji}}{\sum_n P_{jn} Q_{jn}} \qquad [2]$$

W_i is country specific so each country's aggregate commodity price index is unique. After taking logs, geometric weighting provides the rate of change of prices in first differences, and avoids the numeraire problem, which affects deflated arithmetically weighted indices. The index, which is constructed using annual data for 113 developing countries for the period 1957-1997, is deflated by the export value index of industrialised countries from *International Financial Statistics*. Further details on the structure and coverage of the indices can be found in Dehn (2000a).

Most empirical case studies of trade shocks treat shocks as discrete events characterised by large price changes (see for example the collection of case studies in Collier, Gunning and associates (1999)). For larger samples, a statistical approach to identifying temporary shocks is necessary given the lack of information about suitable cut off points. We locate shocks by differencing each country's aggregate real commodity price index series to make it stationary, removing 'predictable' elements from the stationary process, and normalising the residuals. Finally, an extreme cut-off point, which is arbitrary but consistent across countries, is applied to the stationary residuals from [3]. Shocks are those observations, positive and negative, which exceed the critical value associated with the 2.5% most extreme observations in each tail.

The basic forecasting model used to identify shocks is the following:

$$\Delta y_{it} = \alpha_0 + \alpha_1 t + \beta_1 \Delta y_{i,t-1} + \beta_2 y_{i,t-2} + \varepsilon_{it}; \quad t = 1,\ldots,T \qquad [3]$$

Deaton (1992) notes the difficulties in unambiguously deciding whether commodity prices are I(1) or I(0). The relevant decision is therefore whether to select an I(1) or an

I(0) specification arbitrarily (with the accompanying risk of introducing pre-test misspecification errors) or whether to adopt a near-agnositic specification (where the risk is a loss in efficiency). [3] is a useful specification, because if the 'true' process is I(0), [3] is exactly equivalent to an AR(2) in levels. To see this, simply rewrite as:

$$\begin{aligned} & y_{it} = \alpha_0 + \alpha_1 t + (\beta_1 + 1) y_{i,t-1} + (\beta_2 - \beta_1) y_{i,t-2} + \varepsilon_{i,t} \\ & \Rightarrow y_{it} = \alpha_0 + \alpha_1 t + \beta^* y_{i,t-1} + \gamma^* y_{i,t-2} + \varepsilon_{i,t} \end{aligned} \qquad [4]$$

Estimating the starred levels equation and unscrambling produces exactly the same estimates of the $\{\alpha_0^*, \alpha_1^*, \beta^*, \gamma^*\}$ parameters as from the non-starred equation. Inclusion of the lagged level term in the difference equation implies that there are no restrictions and the equation is therefore a reformulated levels equation and not a differenced equation. On the other hand, if the process is I(1), inclusion of the lagged level term is irrelevant (except for using up one degree of freedom), since the coefficient will be estimated as close to zero - OLS is in fact super-consistent and convergence is very fast - although the t-statistics have the Dickey-Fuller distribution and not the Student distribution. As commodity prices are not clearly either I(0) or I(1) over the sample period, the agnostic view is preferable to imposing $\beta_2 = 0$ on some commodities and not others, which would introduce possible misspecification error. The alternative of setting $\beta_2 = 0$ everywhere is unattractive, since some price series will at least appear to be I(0).

Using the 2.5% cut off, there are 179 positive shocks and 99 negative shock episodes for the full 113 countries in the sample. The predominance of positive shocks is not surprising since the production of perishable commodities under stochastic conditions gives rise to large positive price spikes when stock-outs coincide with bad harvests (Deaton and Laroque, 1992). Figures 1 and 2 respectively show the distribution of positive and negative shocks for the 113 countries over the period 1957 to 1997 for a range of cut off points (1% to 10%). The vertical axis shows the proportion of countries, which experienced shocks in any given year. The incidence of shocks increases dramatically during the 1970s, then declines, but remains higher than in the period prior to the 1970s. Positive shocks are concentrated in the 1970s, negative shocks in the 1980s.

Tables 1 and 2 show shock magnitudes and tests for differences in shock sizes across different time periods, producer types and regions.[1] Magnitudes are measured as the growth rate of prices in the year of the shock. On average positive shocks were the same size as negative shocks. The positive shocks were concentrated during 1973-1985, and the negative shocks during 1986-1997. Oil shocks (positive and negative) were larger than shocks affecting other commodities. The most shock-prone region was the Middle East and North Africa.

While oil shocks are clearly important, it is noteworthy that the distribution of oil shocks does not account for the overall distribution of shocks in the sample. Even in 1973-74 59

[1]To read table 2, read down the columns. The magnitude of shocks for the group at the top of each panel is compared with the magnitudes of shocks for the groups listed on the left with stars indicating the conventional levels of statistical significance.

countries experienced positive shocks, of which only 23 were oil producers.[2] No fewer than 13 non-oil commodities were subject to shocks in 1973[3], and 15 in 1974[4]. Similarly, in 1986 40 countries[5] were exposed to negative commodity price shocks as 10 different commodities were subject to sharp downwards price slumps[6].

The distribution of shocks is also not substantially affected by the choice of deflator (Figure 3). Most individual country commodity price indices are 2 to 3 times as volatile as the deflator[7]. Even for the largest change in the MUV, an 11% rise in 1986, the average price change for the 40 countries with negative shocks in that year was 50%.

3. Shocks, Growth and Aid

We now introduce shocks into the Burnside and Dollar (2000) analysis of aid and growth. They analyzed growth in 56 countries over the period 1970-93, dividing the period into four-year sub-periods over which growth was measured, yielding 336 observations of growth episodes. In order to maintain precise comparability with Burnside and Dollar we start from their sample of countries, their periodization, their measure of macroeconomic policy, and their other explanatory variables. Subsequently, we introduce variations as robustness checks.

The first column of Table 3 reproduces the Burnside and Dollar result. Controlling for a few variables commonly found in growth regressions, the rate of growth over a four year period is significantly increased by better policy, and by the interaction of policy and aid: aid and policy are complements. Aid here is measured as the net flow of Official Development Assistance, as a percentage of GDP.

These results are dependent upon the exclusion of outlier episodes for three very small economies: Gambia, Guyana and Nicaragua. The second column of Table 3 reproduces the regression including these outliers.

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[2] Countries with 1973 shocks: Argentina, Benin, Bolivia, Botswana, Brazil, Burkina Faso, Chad, Chile, Lesotho, Liberia, Mali, Mongolia, Niger, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Seychelles, Singapore, Solomon Islands, Sudan, Thailand, Uruguay, Vanuatu, and Zambia.
Countries 1974 shocks: Algeria, Angola, The Bahamas, Bahrain, Bhutan, Cameroon, Colombia, Congo, Ecuador, Egypt, Fiji, Gabon, Gambia, Indonesia, Iran, Iraq, Jordan, Kuwait, Malaysia, Mexico, Morocco, Nigeria, Oman, Philippines, Qatar, Saudi Arabia, Senegal, Syrian Arab Republic, Togo, Trinidad & Tobago, Tunisia, United Arab Emirates, and Venezuela.

[3] The shocks in these 13 other commodities were identified using the same methodology used to identify shocks in the aggregate country indices. The extent to which shocks in individual price indices feed through to aggregate indices is analysed in Dehn (2000b). The 13 commodities referred to here are coffee, cotton, fishmeal, linseed oil, maize, rice, sisal, sorghum, soybean meal, soybean oil, soybeans, wheat, and zinc.

[4] Coconut oil, coconut oil (Philippines), groundnut oil, groundnuts, linseed oil, palm kernels, palm oil, phosphate rock, rice(Thailand), rice, sisal, soybean oil, sugar, super phosphates, and urea.

[5] Countries with negative shocks in 1986: Algeria, Angola, Argentina, The Bahamas, Bahrain, Bangladesh, Benin, Bolivia, Burkina Faso, Cameroon, Chad, Colombia, Congo, Dominican Republic, Ecuador, Egypt, Gabon, Guinea-Bissau, Indonesia, Iran, Iraq, Kuwait, Malaysia, Mali, Mexico, Nepal, Nigeria, Oman, Pakistan, Paraguay, Qatar, Saudi Arabia, Singapore, Solomon Islands, Sudan, Syrian Arab Republic, Trinidad & Tobago, Tunisia, United Arab Emirates, and Venezuela.

[6] Cotton, groundnut oil, jute, nickel, crude oil, palm oil, sorghum, soybean oil, tin (Bolivia), and tin (other origins).

[7] These differences are statistically significant at the 1% level with a few minor exceptions: South Africa's commodity index residuals were less volatile than MUV. The commodity indices of the mixed producers were a little less than twice as volatile as MUV and only significant at the 5% level. Finally, the average standard deviation of all country indices for the period from 1957-1972 was 6.4%, which is only slightly higher than the MUV standard deviation of 5.2%.. The difference, however, was significant at the 1% level.

The third column of Table 3 introduces commodity price shocks. We use the full sample, including the cases discarded as outliers by Burnside and Dollar. The measure described in Section 2 is based on annual data. To apply it in the context of the Burnside and Dollar analysis requires the construction of a variable, which describes commodity price shocks on the basis of their four-year episodes. Since there are far fewer price shocks than episodes, most episodes either have no price shock or a single price shock. For these cases we introduce two dummy variables, which take the value of unity when there is a positive or a negative price shock respectively. These dummies are then interacted with the size of the price shock. For a few episodes there are multiple price shocks. In these cases we define the shock as the largest of the price changes (in absolute value). We experimented with introducing further dummy variables for these subsidiary shocks but, perhaps because of their infrequency, they were never significant and are not reported. Thus, the variables for positive and negative shocks take the value zero if no such shock occurred, and otherwise take the value of the largest price shock during the episode. Note that our single-year price shock might occur in any one of the four years of a Burnside-Dollar episode. The regression measures the impact on the growth rate during the episode. Hence, the growth consequences of the shock are tracked for the year of the shock plus, on average, the subsequent eighteen months (with a range of 0-36 months).

Negative shocks significantly reduce the growth rate while positive shocks have no significant effect. The introduction of positive and negative terms of trade shocks restores the Burnside and Dollar results on the full sample. All three countries, which they discard as outliers, experienced large export shocks. Both policy and the interaction of policy and aid are significant.

We now investigate the interaction of aid and shocks. Potentially, aid has two types of cushioning effects, one due to its initial level and the other due to any change coincident with the shock. A persistently high level of aid might buffer the impact of export price shocks because it reduces the proportionate change in foreign currency inflows. Counter-cyclical changes in aid might offset the effects of export price shocks by reducing the absolute change in the foreign currency inflow. We test for the first or these effects by introducing two additional variables. These are the interaction of the level of aid in the previous four-year period with the positive and negative shock variables. The change in aid could potentially be measured only during the year of the shock. However, even were this significant, it would be of little interest: in practical terms it is not possible to synchronize aid so closely with price movements. Hence, we measure the change in aid between episodes. This measure is then interacted with the positive and negative shock variables. Thus, in column four of Table 3 we add four interaction terms, testing for the level and change in aid during positive and negative shocks.

Since positive shocks are themselves insignificant in the growth process, it would seem unlikely that aid would substantially alter their effects. We find that the change in aid interacted with positive shocks is indeed insignificant. The interaction of the previous level of aid with positive shocks is statistically significant at the 5% level: higher initial levels of aid appear to enhance the effect of positive shocks. A possible mechanism by which this might come about is that the higher is initial aid the lower will be the

government's need to tax international trade. With lower taxation of trade the windfall accruing to the government will be smaller, while a greater proportion will accrue to the private sector, which might handle it better. However, we do not test this speculation.

The more important results concern negative shocks. The interaction of the shock with the initial level of aid is insignificant, but the interaction with the change in aid is significant at 1%: increased aid mitigates the adverse effects of terms of trade deterioration. To quantify this effect, consider the effect of the mean negative price shock of 40%. The introduction of the interaction terms does not alter the previous result that negative shocks significantly reduce the growth rate during the episode. Taking the coefficient on the negative shock variable, a 40% price shock reduces growth by 1.38% per year unless this effect is mitigated by an increase in aid. Thus, by the end of the episode output is 5.5% lower and the total loss of output during the episode is equal to around 14% of income in the initial year.[8]

To get some sense of the plausibility of these magnitudes it is useful to convert the price shock into its direct implications for income. In the Appendix we show the approximate direct loss of national income due to the fall in export prices. We measure the loss as a percentage of pre-shock income, using the assumption that the quantity of exports is not affected. On average, the negative price shocks constituted a direct loss of income of around 6.8% in the year of the shock. Hence, the multiplier from the initial loss of income to the induced loss of output of 14% during the episode is around two. There are various ways in which such a loss of output could come about. Prices might be slow to adjust, yielding unemployment and a Keynesian recession. Alternatively or additionally, the income decline might reduce investment, and the reduction in the price of exports might directly reduce labor supply. The implied size of the multiplier is not implausible, and it is sufficiently large to be of policy concern. Even were the economy to fully recover in the subsequent episode, the typical large negative shock analyzed here would have cost around 21% of a year's income.

According to the coefficient on the interaction of the shock with the change in aid, for the mean price shock this adverse growth would be fully offset were aid to increase by 0.81% of GDP sustained over the four-year episode.[9] The amount of aid needed fully to offset this decline in output is thus only around half the direct loss in income from the fall in the price of exports. The implication that aid has a higher multiplier than income accruing to exporters is surely implausible. However, the difference is within the confidence interval of the estimated effects. To see this we compute the ranges of estimated growth effects for the mean negative price shock (with its implied income loss of around 6.8%), and an increase in aid during the four year episode totaling 6.8% of initial year income (i.e. an annual increase in aid of around 1.7%).

Range of effects for the 95% confidence interval:

[8] The average negative shock reduces growth –1.38% (40.5%*0.03398). On an epoch basis (4 years), negative shocks therefore reduce growth by: 4*-1.376%=5.50%.

[9] For a 1% change in aid, the average negative price shock interacted with aid augments growth by: 40.5% times 0.0418=1.69%. On an epoch basis, the aid provided is 4 times 1%, i.e. 4%. Similarly, the off-set on growth is therefore also larger at: 4*1.69%=6.77%.

Evaluation point	Shock-Growth Coefficient Mean shock = 6.8% of initial income	4-year Growth Effect (%)	Shock*Change in Aid Growth Coefficient Extra Aid = 6.8% of initial income	4-year Growth Effect (%)
Mean	-0.034	5.50	0.071	11.51
95% confidence interval (lower)	-0.062	10.04	0.116	18.666
95% confidence interval (upper)	-0.006	0.97	0.027	4.352

Even if the multiplier on aid is no higher than that on export income, the benefits from aid during these severe negative shocks are considerable. Recall that these beneficial effects are over-and-above its normal effects on growth, since these are included in the regression. To put these results in the perspective of the original Burnside and Dollar findings, the enhanced effectiveness of aid on growth during severe negative shocks is approximately equal to the difference between its effectiveness in the best and the worst policy environments under non-shock conditions.

We now test our results for robustness, changing our measure of price shocks and varying the sample of countries.

We first construct alternative definitions of shocks. Variant 1 calculates shocks as the average price change of all shocks during the epoch. This definition assumes that relatively large and relatively small shocks have the same effects. Variant 2 is simply the average commodity price change during epochs in which the shock occurs, not just the shock year-specific price change.[10] The drawback of this definition relative to our initial measure is that the average price over the epoch may take a sign opposite to the shock if, for example, three moderately large negative price changes offset a positive shock within an epoch. For example, during 1974-77, Benin had a positive shock, but the average price change for the entire epoch was –0.041. To avoid this, such episodes were dropped from the sample of shocks, which is therefore smaller than for the two other definitions.

The first column in Table 4 replicates the last regression in Table 3 using as the epoch shock measure the average shock price changes (rather than the largest shock price change). This has virtually no effect on the magnitude of the shock effects. The second column of Table 4 shows the other alternative specification (average price changes for all years during shock epoch). As this variable is generally smaller in magnitude, the coefficient is larger, but the key regressions retain their significance and sign.

Another consideration pertains to sample composition. Regression 3 in Table 4 drops all oil producers.[11] Dropping oil countries has no impact on the results other than to slightly *increase* the magnitude of the negative shock variable on growth. We take this to indicate that shocks have important effects in a wide range of countries. It is well-known that aid

[10] This variable is constructed as follows: (i) Obtain the average change in commodity prices for all four year epochs; (ii) Split the price changes into positive and negative average price changes; (iii) Generate two shock variables, which takes the value of 0 during epochs without shocks, and the average price change during epochs with shocks.

[11] Defined as those countries for which oil constitutes a 50% or larger share of the exports in their commodity price index.

regressions can be sensitive to the inclusion of Botswana, which has managed to secure atypically high returns to aid. In column 4 of Table 4 we therefore drop Botswana from the sample. We note that while the Burnside-Dollar result is sensitive to this exclusion, our results are unaffected by this change.

Finally, in columns 5 we examine how the shock*aid relationship is supported in a sample of African countries only. We observe that the link between aid and negative shocks remains significant, even in this substantially smaller sample.

4. Shocks and the Allocation of Aid

We now investigate whether aid is in fact allocated in response to shocks. This is of both econometric and policy significance. Burnside and Dollar are able to investigate the effect of policy on aid without the need to instrument for aid because they show that aid has not been allocated with reference to policy. If donors are in fact allocating aid with reference to shocks then the above results will need to be revised accordingly.

With respect to aid*shocks, our results suggest that economies indeed suffer adverse growth consequences from negative export price shocks and that aid is potentially useful in ameliorating these effects. However, the implications for aid allocation are demanding. In particular, a sustained high level of aid is not effective in ameliorating such shocks, rather it is necessary for aid to increase coincident with the decline in export prices. The previous shock-compensating aid program, Stabex, a program run by the European Union, notably failed in this respect. As shown by Herman et al. (1990) disbursement of Stabex aid was so slow that it was actually *pro*-cyclical. Stabex attempted to disburse aid through projects, and such a modality inevitably imposes delays, which preclude speedy response to price shocks. While the Stabex program was at least designed to address the problem of negative commodity price shocks, in general aid has been unresponsive.

To measure this we incorporate such shocks into the Alesina-Dollar (2001) analysis of donor behavior. Note that the episodes are now five-year periods not four-year periods. In Table 5 the first column reproduces the Alesina-Dollar regression. Donor behavior is readily explained by such factors as prior colonial status. The second column repeats the regression for the smaller sample size necessitated by combining their data set with our data on export price shocks. Note that since this involves dropping Israel from the sample, we must also drop the dummy variable for that country. The reduced sample does not significantly alter the results. In the third column we introduce a dummy variable which takes the value of unity if there was a negative shock during the episode. The variable is highly insignificant. Finally, in order to increase precision, we replace this general dummy variable with five dummy variables, one for each of the five years during the episode. Thus, for example, if there was a negative export price shock in the second year, this variable will be set to unity. Were donors reacting to shocks but with a lag then we would expect those shocks that occurred early in the five-year episodes to significantly increase average aid receipts during the period. None of the five dummy variables is close to being significant. Hence, donors do not appear to have taken shocks into account in determining their allocations of aid.

This is scarcely surprising. Donors have lacked a modality for responding to export price shocks. Project aid, which is the majority of aid, cannot be increased rapidly since the flow of funds is determined by the timetables of project design and implementation. Program aid could potentially respond to shocks but rapid increases are currently constrained by the design of IMF programs. Programs are set for a three-year period and increases in aid beyond those planned into the program are supposed to be accumulated in foreign exchange reserves rather than spent. This is an obvious disincentive for donors to provide shock-responsive aid.

5. Conclusion

Within the Burnside-Dollar framework of the effects of aid on growth during four-year episodes, we have estimated the effects of large export price shocks. We have found that negative shocks have substantial adverse effects on output, which even over a period of four years or less are around twice as large as the direct loss of export income. Once such shocks were included, the Burnside and Dollar result that aid is more effective in better policy environments is robust to the changes in sample proposed by Hansen and Tarp (2001) in their critique of Burnside and Dollar. The adverse effects of negative export price shocks can, however, be mitigated by broadly contemporaneous increases in aid. The implied pay-off to aid targeted to shock compensation is large relative to its normal growth-enhancing effects, and is also large relative to the improvements in aid effectiveness achievable from targeting aid onto better policy environments. In view of this we investigated the extent to which aid has actually been systematically targeted to countries suffering large negative terms of trade shocks. Incorporating shocks into the Alesina-Dollar model of aid allocation, we found no evidence that donors had been responsive to them. Thus, both policy and adverse export price shocks should influence aid allocations but have not in the past done so. As donors adjust their allocation rules to take these circumstances into account, the effectiveness of aid in reducing poverty can be expected to increase.

References

Alesina, A. and Dollar, D. (2000): "Who Gives Foreign Aid to Whom and Why?', *Journal of Economic Growth*, 5(1), March 2000, pp. 33-63.

Burnside, C. and Dollar, D. (2001): 'Aid, Policies, and Growth', *American Economic Review*, 90(4), pp. 847-868.

Collier, P. and Dollar, D. (2001): 'Aid Allocation and Poverty Reduction', *forthcoming (European Economic Review)*

Collier, P. and Gunning, J. W. and Associates (2000): *Trade Shocks in Developing Countries*, Oxford University Press, Oxford.

Deaton, A. (1992): 'Commodity Prices, Stabilisation, and Growth in Africa', *Princeton University Development Discussion Paper*, No. 166, Princeton University.

Deaton, A. and Laroque, G. (1992): 'On the Behaviour of Commodity Prices', *Review of Economic Studies*, Volume 59, pp. 1-23.

Deaton, A. and Miller, R. (1995) 'International Commodity Prices, Macroeconomics Performance, and Politics in Sub-Saharan Africa', *Princeton Studies in International Finance*, No. 29 (December), Princeton University.

Dehn, J. (2000a): 'Commodity Price Uncertainty in Developing Countries', *World Bank Policy Research Working Papers*, No. 2426, World Bank, Washington, DC.

Dehn, J. (2000b): *Commodity Price Uncertainty and Shocks: Implications for Investment and Growth*, D.Phil Thesis, Department of Economics, University of Oxford.

Dehn, J. (2001): 'Commodity Price Uncertainty and Shocks: Implications for Economic Growth', paper presented at the Royal Economic Society Annual Conference 2001, University of Durham 9th-11th April 2001.

Guillaumont, P. and Chauvet, L. (2001): 'Aid and Performance: A Reassessment', *forthcoming (Journal of Development Studies),* August 2001.

Hansen, H. and Tarp, F. (2001): 'Aid and growth regressions'. *Journal of Development Economics*, Vol. 64(2), pp. 547-570.

Hermann, R., Burger, K. and Smit, H.P. (1990): 'Commodity Policy: Price Stabilisation Versus Financing', in Sapsford, D.A. and Winters, L. A. (1990) *Primary Commodity Prices: Economic Models and Policy*, Cambridge University Press, Cambridge.

Figure 1: Sensitivity of Temporal Distribution of Positive Shocks to Changes In the Cut Off Point

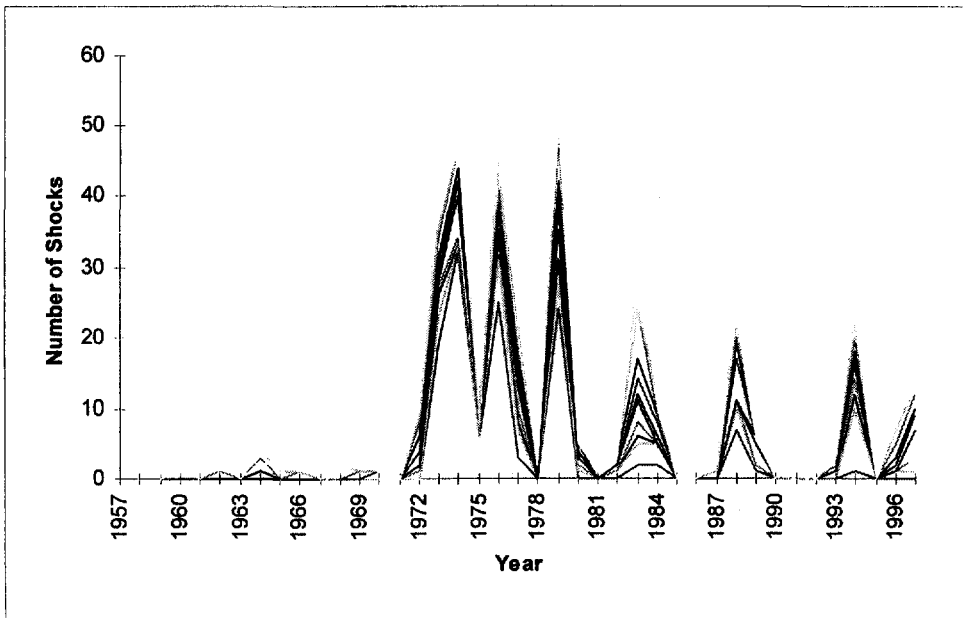


Figure 2: Sensitivity of Temporal Distribution of Negative Shocks to Changes In the Cut Off Point

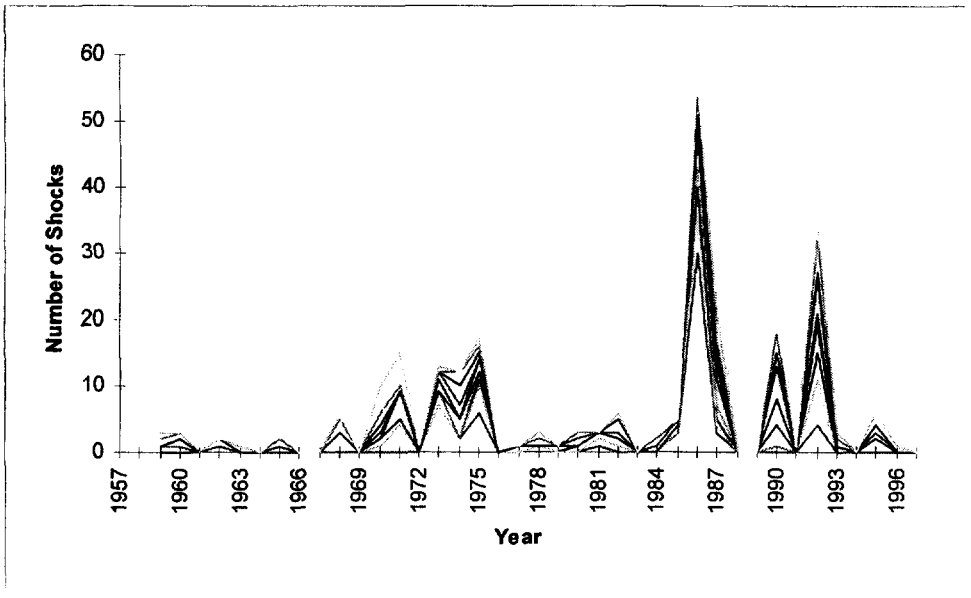
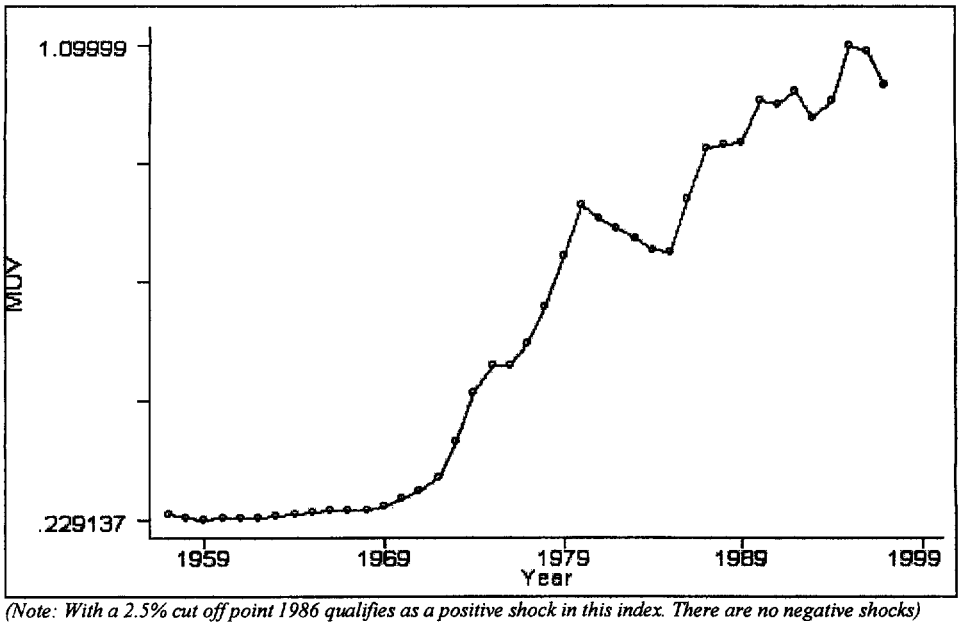


Figure 3: Export Unit Value Index for Industrial Countries (MUV) deflator



(Note: With a 2.5% cut off point 1986 qualifies as a positive shock in this index. There are no negative shocks)

Table 1: Country Shock Magnitudes, By Regional Affiliation, Producer Type, and Time Period

			Positive Shocks		*Negative shocks*	
Category	n	obs	Positive shocks % change	Stand. Dev.	Negative shocks % change	Stand. Dev.
All countries	113	4633	44	26	44	21
Sub-Saharan Africa	44	1804	41	22	34	18
Middle East and North Africa	16	656	75	27	69	17
Latin America	17	697	37	18	33	16
South Asia	5	205	34	18	51	15
East Asia	11	451	38	19	49	13
Pacific	5	205	30	13	46	19
Caribbean	14	574	38	26	31	23
South Africa	1	41	na	na	na	na
Agricultural foodstuffs	52	2132	34	16	27	12
Agricultural non-foods	18	738	31	13	34	14
Non-agricultural non-oil	17	697	38	22	48	14
Oil	23	943	76	23	72	11
Mixed	3	123	21	6	32	3
1957-1972	113	1808	20	na	27	14
1973-1985	113	1469	47	27	35	15
1986-1997	113	1356	34	17	45	23

Table 2: Tests for Equality of Country Shock Magnitudes, By Region, Producer Type, and Time Period

Positive shock magnitudes, regional comparison

	Sub-Saharan Africa	Middle East and North Africa	Latin America	South Asia	East Asia	Pacific
Sub-Saharan Africa						
Middle East and North Africa	-33.6***					
Latin America	0	37.5***				
South Asia	0	41.4***	0			
East Asia	0	36.5***	0	0		
Pacific	11.2*	44.8***	0	0	0	
Caribbean	0	36.9***	0	0	0	0

Negative shock magnitudes, regional comparison

	Sub-Saharan Africa	Middle East and North Africa	Latin America	South Asia	East Asia	Pacific
Sub-Saharan Africa						
Middle East and North Africa	-35.3***					
Latin America	0	35.6***				
South Asia	-17.3**	18.0**	-17.6**			
East Asia	0	28.2***	0	10.1*		
Pacific	-12.2*	23.1**	-12.5***	0	0	
Caribbean	0	37.7***	0	19.6**	0	0

Positive shock magnitudes, producer type comparison

	Agricultural foodstuffs	Agricultural non-foods	Non-agricultural non-oil	Oil
Agricultural foodstuffs				
Agricultural non-foods	0			
Non-agricultural non-oil	0	-6.9*		
Oil	-41.7***	-44.3***	-37.3***	
Mixed	13.0**	10.5**	17.4**	54.8***

Negative shock magnitudes, producer type comparison

	Agricultural foodstuffs	Agricultural non-foods	Non-agricultural non-oil	Oil
Agricultural foodstuffs				
Agricultural non-foods	-6.7**			
Non-agricultural non-oil	-13.7***	-7.0*		
Oil	-43.1***	-36.4***	-29.4***	
Mixed	0	0	9.8*	39.2***

Positive shock magnitudes, time period comparison

	1957-1972	1973-1985
1957-1972		
1973-1985	Na	
1986-1997	Na	12.3***

Negative shock magnitudes, producer type comparison

	1957-1972	1973-1985
1957-1972		
1973-1985	0	
1986-1997	-18.2**	-11.1***

Table 3
Dependent variable: GDP growth rate per capita

Regression no.	**1**	**2**	**3**	**4**
Variable name	**Burnside Dollar**	**Burnside Dollar (full sample)**	**Burnside Dollar (full sample) and shocks**	**Shock * Aid**
Initial Income	-0.60	-0.62	-0.59	-0.77
	(0.59)	*(0.58)*	*(0.55)*	*(0.59)*
Ethnolinguistic Fractionalisation	-0.42	-0.56	-0.41	-0.38
	(0.75)	*(0.74)*	*(0.74)*	*(0.78)*
Assassinations	-0.45 *	-0.44	-0.40	-0.37
	(0.27)	*(0.27)*	*(0.27)*	*(0.29)*
Ethnolinguistic Fractionalisation * Assassinations	0.79 *	0.80 *	0.68	0.63
	(0.46)	*(0.46)*	*(0.46)*	*(0.48)*
Institutional Quality	0.69 ***	0.64 ***	0.64 ***	0.67 ***
	(0.18)	*(0.18)*	*(0.17)*	*(0.19)*
M2/GDP	0.01	0.01	0.01	0.02
	(0.01)	*(0.01)*	*(0.02)*	*(0.02)*
SSA	-1.87 **	-1.60 **	-1.76 **	-2.05 ***
	(0.78)	*(0.75)*	*(0.77)*	*(0.73)*
EASIA	1.31 **	0.96	1.29 **	1.21 *
	(0.60)	*(0.58)*	*(0.60)*	*(0.64)*
Policy	0.71 ***	0.97 ***	0.69 ***	0.82 ***
	(0.20)	*(0.19)*	*(0.20)*	*(0.19)*
Aid	-0.02	0.01	-0.09	-0.20
	(0.16)	*(0.13)*	*(0.16)*	*(0.13)*
Aid * Policy	0.19 **	0.01	0.21 ***	0.10 *
	(0.07)	*(0.05)*	*(0.07)*	*(0.06)*
ed3	-0.01	-0.01	-0.26	1.31 *
	(0.59)	*(0.59)*	*(0.59)*	*(0.71)*
ed4	-1.41 **	-1.37 **	-1.42 **	0.53
	(0.65)	*(0.65)*	*(0.66)*	*(0.69)*
ed5	-3.47 ***	-3.39 ***	-3.34 ***	-1.32 **
	(0.61)	*(0.60)*	*(0.62)*	*(0.64)*
ed6	-2.01 ***	-1.98 ***	-1.17 **	0.62
	(0.54)	*(0.54)*	*(0.55)*	*(0.55)*
ed7	-2.26 ***	-2.33 ***	-2.03 ***	
	(0.66)	*(0.65)*	*(0.67)*	
Negative shocks			-0.03 ***	-0.03 **
			(0.01)	*(0.01)*
Positive shocks			0.02	0.00
			(0.01)	*(0.01)*
Negative shocks * change in aid				0.04 ***
				(0.01)
Positive shocks * change in aid				0.00
				(0.02)
Negative shocks * lagged level aid				0.01
				(0.00)
Positive shocks * lagged level aid				0.02 **
				(0.01)
N (countries)	56	56	56	56
n (observations)	270	275	275	234
F	16.750 ***	17.080 ***	15.530 ***	15.030 ***
Rsq	0.394	0.392	0.417	0.458

Table 4
Dependent variable: GDP growth rate per capita

Regression no.	1	2	3	4	5
Variable name	**Alternative Shock Measurement #1**	**Alternative Shock Measurement #2**	**Dropping Oil Producers**	**Drop Botswana (Atypical Aid-Growth Country)**	**African Countries Only**
Initial Income	-0.78	-0.76	-0.62	-0.90	-0.98
	(0.59)	*(0.58)*	*(0.62)*	*(0.59)*	*(1.73)*
Ethnolinguistic Fractionalisation	-0.39	-0.10	-0.19	-0.24	1.04
	(0.78)	*(0.82)*	*(0.84)*	*(0.78)*	*(1.94)*
Assassinations	-0.37	-0.34	-0.39	-0.34	4.18
	(0.29)	*(0.29)*	*(0.30)*	*(0.29)*	*(8.36)*
Ethnolinguistic Fractionalisation * Assassinations	0.63	0.55	0.75	0.53	-5.59
	(0.48)	*(0.49)*	*(0.49)*	*(0.49)*	*(14.59)*
Institutional Quality	0.68 ***	0.70 ***	0.91 ***	0.62 ***	0.91
	(0.19)	*(0.19)*	*(0.19)*	*(0.19)*	*(0.55)*
M2/GDP	0.02	0.01	0.02	0.01	0.06
	(0.02)	*(0.02)*	*(0.02)*	*(0.02)*	*(0.05)*
SSA	-2.05 ***	-2.03 ***	-2.32 ***	-2.28 ***	
	(0.73)	*(0.76)*	*(0.71)*	*(0.73)*	
EASIA	1.21 *	0.98	0.14	1.30 **	
	(0.64)	*(0.64)*	*(0.74)*	*(0.63)*	
Policy	0.82 ***	0.93 ***	0.96 ***	0.78 ***	1.97 **
	(0.19)	*(0.19)*	*(0.22)*	*(0.18)*	*(0.80)*
Aid	-0.20	-0.12	-0.09	-0.22	0.01
	(0.13)	*(0.13)*	*(0.14)*	*(0.14)*	*(0.25)*
Aid * Policy	0.10 *	0.05	0.06	0.06	-0.08
	(0.06)	*(0.05)*	*(0.06)*	*(0.05)*	*(0.16)*
ed3	1.31 *	1.95 ***		1.09	
	(0.70)	*(0.72)*		*(0.70)*	
ed4	0.52	0.83	-0.38	0.28	-0.71
	(0.69)	*(0.72)*	*(0.69)*	*(0.69)*	*(1.63)*
ed5	-1.32 **	-1.13 *	-2.54 ***	-1.52 **	-2.31
	(0.64)	*(0.64)*	*(0.69)*	*(0.64)*	*(1.68)*
ed6	0.62	0.83	-0.65	0.51	-0.69
	(0.56)	*(0.55)*	*(0.56)*	*(0.57)*	*(1.26)*
ed7			-1.81 **		-2.29
			(0.73)		*(1.74)*
Negative shocks	-0.03 **	-0.61 ***	-0.04 ***	-0.03 **	-0.02
	(0.01)	*(0.23)*	*(0.01)*	*(0.01)*	*(0.04)*
Positive shocks	0.00	-0.25	0.02	0.00	-0.03
	(0.01)	*(0.22)*	*(0.02)*	*(0.01)*	*(0.04)*
*Negative shocks * change in aid*	*0.04* ***	*0.71* ***	*0.04* ***	*0.04* ***	*0.06* ***
	(0.01)	*(0.25)*	*(0.02)*	*(0.01)*	*(0.02)*
Positive shocks * change in aid	0.00	0.19	0.00	0.00	-0.05 ***
	(0.02)	*(0.25)*	*(0.02)*	*(0.02)*	*(0.02)*
Negative shocks * lagged level aid	0.01	0.04	0.01 *	0.01	0.01
	(0.00)	*(0.12)*	*(0.00)*	*(0.00)*	*(0.01)*
*Positive shocks * lagged level aid*	*0.02* **	*0.63* ***	*0.00*	*0.02* **	*0.02*
	(0.01)	*(0.18)*	*(0.01)*	*(0.01)*	*(0.01)*
N (countries)	56	56	47	55	21
n	234	234	197	231	74
F	15.010 ***	14.550 ***	11.840 ***	13.910 ***	8.760 ***
Rsq	0.458	0.465	0.492	0.454	0.417

Table 5
Dependent variable: Log of Aid (five year averages) 1970-1994

Regression no.	**1**	**2**	**3**	**4**
Variable name	**Alesina-Dollar (their sample)**	**Alesina-Dollar (shock sample)**	**2 with shocks**	**3 with within-epoch shock dummies**
Log (initial income)	6.58 ***	7.29 ***	7.29 ***	7.27 ***
	(1.22)	*(1.02)*	*(1.02)*	*(1.04)*
[Log(initial income)] squared	-0.49 ***	-0.53 ***	-0.53 ***	-0.53 ***
	(0.08)	*(0.07)*	*(0.07)*	*(0.07)*
Log (population)	1.61 **	1.01 *	0.99 *	1.01 *
	(0.79)	*(0.54)*	*(0.54)*	*(0.54)*
[Log (population)] squared	-0.04	-0.02	-0.02	-0.02
	(0.02)	*(0.02)*	*(0.02)*	*(0.02)*
Openness	0.41 ***	0.38 ***	0.37 ***	0.35 ***
	(0.15)	*(0.11)*	*(0.12)*	*(0.12)*
Democracy	-0.14 ***	-0.07 **	-0.07 **	-0.07 **
	(0.04)	*(0.03)*	*(0.03)*	*(0.03)*
US UN Friend	-0.01	-0.04	-0.04	-0.04
	(0.02)	*(0.03)*	*(0.03)*	*(0.03)*
Japan UN Friend	0.16 ***	0.10 **	0.10 **	0.10 **
	(0.04)	*(0.05)*	*(0.05)*	*(0.05)*
Log (years as colony)	0.27 ***	0.11 ***	0.11 ***	0.12 ***
	(0.06)	*(0.04)*	*(0.04)*	*(0.04)*
Egypt	1.44 ***	1.52 ***	1.52 ***	1.53 ***
	(0.15)	*(0.15)*	*(0.16)*	*(0.15)*
Israel	6.81 ***			
	(2.21)			
Muslim	0.00 *	0.00	0.00	0.00
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*
Roman Catholic	0.00	0.00	0.00	0.00
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*
Other	0.00 *	0.00 *	0.00 *	0.00 *
	(0.00)	*(0.00)*	*(0.00)*	*(0.00)*
Negative shocks			0.06	0.27
			(0.10)	*(0.22)*
Negative shock * Second Year				-0.36
				(0.26)
Negative shock * Third Year				-0.07
				(0.27)
Negative shock * Fourth Year				-0.24
				(0.49)
Negative shock * Fifth Year				-0.55
				(0.50)
N (countries)	85	80	80	80
n	397	372	372	372
F	58.850 ***	58.140 ***	53.080 ***	49.010 ***
Rsq	0.625	0.661	0.661	0.663

Appendix 1: Shock magnitudes

Positive shocks

Country	Year of Shock	Commodity Share in GDP (%, 1990)	Value of shock (% of GDP)
Algeria	1974	3.73	2.65
Cameroon	1974	9.06	3.03
Cameroon	1976	9.06	2.82
Cameroon	1979	9.06	2.76
Colombia	1974	9.45	4.03
Colombia	1976	9.45	4.02
Colombia	1979	9.45	3.62
Costa Rica	1976	11.95	4.71
Dominican Republic	1988	8.43	5.28
Ecuador	1974	21.94	9.25
Ecuador	1979	21.94	11.34
Egypt	1974	2.22	1.10
Egypt	1979	2.22	0.97
El Salvador	1976	4.44	3.19
El Salvador	1977	4.44	2.34
Gabon	1974	41.36	25.19
Gabon	1979	41.36	26.30
Gambia	1974	4.52	1.88
Guatamala	1976	8.52	4.08
Guyana	1979	56.56	5.61
Guyana	1983	56.56	9.16
Guyana	1988	56.56	14.40
Haiti	1976	0.70	0.86
Haiti	1977	0.70	0.88
Honduras	1976	14.02	5.54
India	1976	1.06	0.16
India	1984	1.06	0.16
Indonesia	1974	10.06	6.56
Indonesia	1979	10.06	6.61
Jamaica	1983	20.04	6.82
Kenya	1976	4.41	2.82
Kenya	1977	4.41	5.31
Kenya	1984	4.41	2.72
Korea, Republic of	1979	0.31	0.07
Madagascar	1976	3.69	2.26
Malawi	1989	20.58	3.70
Malaysia	1974	19.98	12.36
Malaysia	1979	19.98	11.83
Mexico	1974	3.98	2.70
Mexico	1979	3.98	3.29
Morocco	1974	4.57	5.70
Nicaragua	1976	27.60	9.10
Niger	1973	0.18	0.04
Niger	1976	0.18	0.07
Niger	1979	0.18	0.02
Nigeria	1974	44.79	31.71
Nigeria	1979	44.79	39.72
Paraguay	1976	15.35	5.15
Philippines	1974	2.99	0.54
Senegal	1974	4.43	3.19
Sierra Leone	1988	4.56	1.84
Sri Lanka	1983	7.48	2.14
Syrian Arab Republic	1974	13.73	9.58
Syrian Arab Republic	1979	13.73	10.65
Thailand	1988	3.30	0.55
Togo	1974	13.83	13.61
Trinidad & Tobago	1974	16.93	12.96
Trinidad & Tobago	1979	16.93	13.70
Venezuela	1974	21.34	13.93
Venezuela	1979	21.34	16.52
Zaire	1979	10.15	3.37
		Average	6.83
		Median	4.02
		Stdev	7.84
		Max	39.72
		Min	0.02

Negative shocks

Country	Year of Shock	Commodity Share in GDP (%, 1990)	Value of shock (% of GDP)
Argentina	1986	2.64	-0.80
Bolivia	1975	10.04	-5.90
Bolivia	1986	10.04	-3.12
Cameroon	1986	9.06	-3.25
Chile	1975	14.01	-10.12
Colombia	1986	9.45	-3.88
Costa Rica	1987	11.95	-3.91
Costa Rica	1992	11.95	-2.29
Cote d'Ivoire	1981	15.44	-4.60
Dominican Republic	1986	8.43	-1.50
Ecuador	1986	21.94	-11.48
Egypt	1986	2.22	-1.07
El Salvador	1987	4.44	-2.81
El Salvador	1992	4.44	-0.87
Gabon	1986	41.36	-28.27
Gambia	1992	4.52	-1.43
Ghana	1981	17.68	-5.61
Guatamala	1987	8.52	-3.47
Guatamala	1992	8.52	-1.56
Honduras	1987	14.02	-4.54
Honduras	1992	14.02	-2.47
Indonesia	1986	10.06	-7.24
Malaysia	1986	19.98	-12.05
Mali	1986	8.79	-2.47
Mexico	1986	3.98	-3.11
Nicaragua	1992	27.60	-4.72
Nigeria	1986	44.79	-39.36
Pakistan	1986	2.18	-0.66
Paraguay	1986	15.35	-3.61
Peru	1975	4.72	-3.03
Sierra Leone	1981	4.56	-1.94
Somalia	1974	4.70	-0.83
Syrian Arab Republic	1986	13.73	-10.91
Trinidad & Tobago	1986	16.93	-13.76
Tunisia	1986	6.01	-3.99
Venezuela	1986	21.34	-16.09
Zaire	1975	10.15	-5.79
Zambia	1975	35.49	-26.40
		Average	-6.81
		Median	-3.74
		Stdev	8.37
		Max	-0.66
		Min	-39.36

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