Shocks and Growth: Adaptation, Precaution and Compensation

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Abstract

In this paper we investigate how a wide array of types of shock arising from world prices, natural events, and political violence affect growth. Our results suggest that the impact from political shocks are far greater than from natural shocks. However, our preliminary cointegration results suggest that the cost from primary commodity exporting are very large. Potentially shocks can affect growth either due to their impact, or due to the volatility that repeated shocks generate. In our empirical investigation we find little evidence that volatility is a problem. We investigate the efficacy of economic structure and domestic as well as external policy responses to the various shocks.

What can a government do to moderate the adverse effects of negative shocks and to make the most of favourable shocks? The answer appears to be that governments can do a lot, partly through policies that alter exposure, partly through policies that encourage adaptation and flexibility, and partly by precautionary policies. Countries at risk are better placed with lower levels of debt, smaller fiscal deficits, and larger reserves. In addition international assistance can help to mitigate the impact of shocks. Development assistance as well as remittances can cushion the adverse effect of shocks.

1. Introduction

In this paper we investigate empirically how shocks affect growth. Our work is preliminary: we are in the early stages of a large project and our results should consequently be viewed with an appropriate degree of caution. We consider a wide array of types of shock arising from world prices, natural events, and political violence. Potentially shocks can affect growth either due to their impact, or due to the volatility that repeated shocks generate. The consequences for growth may depend upon non-policy structural characteristics of the economy, such as its level of income: some types of economy may be more vulnerable to others, not just in the sense of being more subject to shocks, but because a given shock has larger consequences.

The consequences of shocks presumably depend in part upon domestic policy choices. The efficacy of policy *responses* to shocks, which is the issue which has received most attention, is statistically somewhat demanding to investigate because of the intrinsic endogeneity of responses to the scale of the shock. However, policy choices made prior to the shock may be more important in determining the consequences and are also less problematic to investigate. We focus on three groups of such policies: exposure, adaptation and precaution. The degree of exposure to some shocks, notably those transmitted through international prices, is to some extent a choice variable: governments can influence whether an economy is more or less open. By adaptation we mean those policies which are likely to make the economy more or less flexible and so potentially more or less able to respond to shocks. By precaution, we mean those policies which enhance the scope for the society to cushion adverse shocks, should it choose to do so. All these domestic policy choices are liable to be influenced by the socio-political processes of decision. Hence, we investigate whether political institutions and social structure prior to a shock influence its consequences for growth. Finally, we consider the efficacy of external policies of compensation. Traditionally, the source of such compensation has been thought of as the public sector – international development assistance. However, international private transfers between households are now larger than aid flows and so it is important to integrate them into the analysis. We therefore

consider both aid and remittances as potential mechanisms for compensation and insurance.

The paper is structured as follows. It is conventional to begin with a discussion of the predictions from economic theory. However, the many different types of shock that we investigate potentially implicate a very wide range of theory and so, at this preliminary stage we have adopted the alternative strategy of discussing pertinent theory at each pertinent stage in our results. Section 2 discusses our data and our statistical methods. Section 3 reports the direct effects of shocks on growth, including short run effects, long-run effects, and those generated by volatility. Section 4 considers the importance of economic structure: are some economies more vulnerable than others? Section 5, which is the core of the paper, focuses on domestic policies. Section 6 introduces international compensation. Section 7 concludes.

2. Data and Method

In this section we discuss how we measured the variables, and our choice of statistical technique.

The impact of shocks and risk of shocks on growth is analysed by using an error-correction model of the form:

$$\Delta Y_{i,t} = \alpha_i + \beta_1 \Delta Y_{i,t-k} + \beta_2 Y_{i,t-1} + \beta_3 S_{i,t-l} + \beta_4 R_{i,t-k} + \beta_5 S_{i,t-l} Struc_{i,t-s}$$
$$+ \beta_6 S_{i,t-l} StrucPol_{i,t-s} + \beta_7 S_{i,t-l} \Pr ecPol_{i,t-s} + \beta_8 S_{i,t-l} PolSys_{i,t-s} + \beta_9 S_{i,t-l} ExAss_{i,t-s} + \varepsilon_{i,t}$$

where $Y_{i,t}$ is log GDP per capita in country i in year t, α_i is a country-specific fixed effect, $S_{i,t}$ is a vector that includes various types of shocks, $R_{i,t-k}$ *is* a vector that includes measures of the risk of shocks, $Struc_{i,t-k}$ is a vector that includes country-specific structural characteristics, $StrucPol_{i,t-k}$ is a vector that includes several measures of structural policies, $PrecPol_{i,t-k}$ is a vector that includes measures of precautionary policies, $PolSys_{i,t-k}$ is a vector that includes indicators of political systems, and $ExAss_{i,t-k}$ is a vector that includes measures of external assistance.

Our dataset consists of all countries in the world for which data are available, and covers the period 1960-2004.

Our measures of shocks include external shocks, political shocks, and natural shocks. As for external shocks, we consider export price shocks and oil import price shocks. The indicator for export price shocks is constructed following the methodology of Deaton and Miller (1995) and Dehn (2000). In particular, we collected data on world commodity prices and commodity export values for individual countries over the period 1960 to 2004. These data are then used to create a country-specific export commodity price index that represents the level of export prices for that country. The indicator for oil import price shocks is constructed by interacting the world oil price index with a dummy that equals one if a country is a net importer of oil and zero otherwise. To control for the impact of oil price shocks on oil exporting countries, we also include an interaction of oil prices and a dummy for oil exporters.

In addition to actual export price and oil import price shocks, we also include measures of the *risk* of these shocks. Following Serven (1998), we use a general autoregressive conditional heteroskedasticity (GARCH (1,1)) model in which the actual volatility in a country's commodity price index is explained by past volatility and past expected volatility. The fitted values of this GARCH model are then used as a measure of commodity export price risk. The indicator for oil import price risk is constructed in a similar way.

We consider two types of political shocks: civil wars and coup d'etats. Data for these shocks are taken from new global data sets. Using empirical models that predict the occurrence of civil wars and coup d'etats, we construct indicators for the risk of a civil war and a coup d'etat. Both the actual shock and the risk of a shock enter the specification above. The estimate of the risk of civil war based on Collier and Hoeffler (2004). A civil war is defined as a major armed conflict that resulted in at least 1,000 battle related deaths per year. The risk of such a conflict is modeled by a number of economic, political, sociological, geographic and historical variables. Our estimate of the

risk is based on the following explanatory variables: the level and structure of income, past growth rates, the peace period since the last civil war, ethnic and religious fractionalization, ethnic dominance and the total population. Only a small number of observations is characterized by civil war, 7.82 percent of the country year observations experienced a civil war.

In addition to the risk of civil war a number of countries face the risk of illegitimate regime change in the form of coup d'états. Since coup d'état are usually perpetrated by the military establishment we follow Collier and Hoeffler (2006) and use a simultaneous model explaining military expenditure and the risk of coup d'état. Additional determinants of coup d'état are the level and growth of income, political regime type, time since last coup and a time trend. Although some countries are plagued by coup traps coups d'état they are a relatively rare event for the average country. The average risk is small at 2.99 percent.

Following Raddatz (2006), the natural shocks we consider are geological, climatic, and human disasters, for which data are taken from the WHO Collaborating Centre for Research on the Epidemiology of Disasters (CRED). In particular, geological disasters include earthquakes, landslides, volcano eruptions, and tidal waves. Climatic disasters include floods, droughts, extreme temperatures, and wind storms. Human disasters include famines and epidemics. In order to identify disasters that could affect a country's macroeconomic performance, we only include episodes that qualify as large disasters according to the criteria established by the International Monetary Fund (IMF, 2003). The risk of natural shocks is measured by the average occurrence of natural shocks in the last five years.

One mechanism to mitigate shocks is through development assistance. However, shocks to growth may be correlated with aid. For example democratization is likely to increase growth but due to improved political openness the country may now also receive more aid. Thus, our regressions may suffer from simultaneity bias and we therefore instrument aid to address possible simultaneity issues. In our methodology we broadly follow

Tavares (2003). He argues that the aid outflow from the donor countries are a good instrument because when an OECD country increases its total aid outflows, recipient countries that are culturally and geographically closer to that donor country experience an exogenous increase of aid inflows. Our sample consists of 76 aid recipients and we use OECD aid outflows to construct instrumental variables. We concentrate on bilateral aid from the five largest OECD donors: Japan, USA, France, Germany and the UK. In 2003 about half of total global aid was provided by these five donors. We then generated four variables to capture the political, geographical and cultural distance for each donor/recipient combination. For political distance we used an index of UN voting affinity (Gartzke and Jo, 2002). For each donor/recipient combination we calculated the average over the entire time period and used this average for every single year.[1] We proxied geographical proximity by the inverse of the distance in kilometers between the recipient countries' capitals and the donor countries' capitals.[2] Cultural distance is captured by two dummy variables. The first dummy variable takes the value of one if the donor and recipient share a common language.[3] The other dummy takes a value of one if a religious group dominates in the donor as well as in the recipient country.[4] All of our distance indicators are invariant over time but vary across the recipient countries while the aid outflow variable varies over time but not across the recipient countries. The aid inflows vary across recipient countries and over time.

We regress the aid inflows on all of the exogenous regressors and the product of the aid outflows times the four distance indicators, i.e. for our five donor countries we can use potentially 20 instruments. Aid is measure at percentage of GNI. Since the OECD data base provides aid outflows in current US dollars we have to use some simple calculations to express these values in the appropriate units.

[1] Although annual values are available we use the average because data series are only available until 1996. Data for Germany only start in 1974, the first year Germany was admitted to the UN. There also seem to be some coding problems with the 1994-96 data for Germany when every country's affinity with Germany is coded as 1.
[2] We used the distance to Washington DC, the distance to Tokyo and the distance to Brussels for the three European donors. Data were made available by the World Bank.
[3] Source: CIA Factbook 2003, http://www.cia.org/publications/factbook
[4] Source: Barrett (1982). If 30 percent or more of the population belong to one religious group in the donor and recipient country the dummy takes a value of one.

$$\frac{aid\inf low_{it}}{GNI_{it}} = \sum_{t=1}^{T}\sum_{i=1}^{N}\sum_{j=1}^{J} aidoutflows_{jt} \cdot d_{ij} \cdot \frac{1}{GNI_{it}}$$

where subscript *t* denotes years, *i* denotes recipient countries and *j* denotes donor countries.

3. Direct Effects of Shocks on Growth

In the empirical literature to date some shocks have attracted more attention than others. The first systematic large-n study of the growth consequences of export price shocks was that of Deaton and Miller (1995). The comparison of the direct effect of these price shocks and the indirect effect arising from risk was investigated by Dehn (2000). The comparison of price shocks with some other types of shock, notably natural and humanitarian disasters, has more recently been investigated by Raddatz (2005). The effect of political shocks on growth has been investigated, both for civil war (Collier, 1999) and for coups (JAE paper). Finally, the concept of 'vulnerablity', in which the risk of a range of shocks is combined, has been investigated in a range of papers by Guillaumont and Chauvet (2002). However, the present paper appears to be the first to take a comprehensive coverage of all these different types of shock, and investigate their direct effects, their effects via risk, and the contribution of a range of structural and policy variables within a common framework.

Short-run effects

We first consider the direct effect of shocks on growth. Since lagged growth effects current growth and shocks affect current growth, the output effects beyond the first year of the shock must be computed from impulse response functions. We control for the level of income and like most other studies find evidence for a convergence effect. At this stage we do not allow for interaction effects. These are introduced below.

External Shocks

In the short run, export prices have a significantly positive effect. A 10% increase in export prices raises growth in that year by 0.32 percentage points and by 0.34 percent in the following year. In the next year there is a further 0.23 percent gain and in the fourth year by 0.09 percent. Thus, cumulatively (but not allowing yet for impulse responses), a one-year increase in export prices by 10% raises growth by around one percentage points of a year's GDP, spread over four years. This is broadly symmetrical: a decline in export prices results in short run losses approximately corresponding to these gains.

The effect of an increase in oil prices on oil importers is evidently of current concern. Our results suggest that for typical oil importer a 10% increase in price would have no significant effect in the year of impact, but in the following year would reduce growth by 0.085 percentage points. The following year growth is reduced by 0.074 percent and the year after by 0.079 percent. Hence, over the four years there is a loss of around -0.24 percent. Evidently, this may persist for further years.

Political shocks

The two political shocks, coups and civil war, have unsurprisingly large adverse effects on growth. A coup appears to cut growth by around 3.5% in the year of the coup. This is likely to be an upper bound since the risk of a coup is endogenous to the growth rate (Collier and Hoeffler, 2006). It is not, in practice, possible to control for this endogeneity. When the coup is entered with a lag it is insignificant, but this is unsurprising, the most reasonable explanation being that the costs of a coup are felt in the short term. We are not able to instrument for coups since the variables we would use as instruments are going to be used to measure the risk of a coup. However, while low growth does raise the risk of a coup, its effect is small, so that the apparent adverse impact of a coup on growth is unlikely to be spurious. The effect of a coup is not persistent. When entered into a regression with decade-average growth rate as the dependent variable it is insignificant.

Thus, over at most five years the economy recovers to its previous growth path. This implies that the upper bound for the cost of a coup (that does not lead to civil war) is around 8.75 percentage points of a year of GDP.

The cost of a civil war is radically higher than this because of its persistence: the typical civil war lasts for around seven years and the recovery is slow, taking over a decade before the trend growth rate is regained. There are also spillover effects onto neighbours. In previous work we estimated these costs to amount to three times annual GDP (Collier and Hoeffler, 2004). However, in that work we used an estimate of the growth loss during war of only 2.2 percentage points, which was based on Collier (1999). From our present regressions we find that the impact on growth is around 3.3%. There seems to be no significant change in this during the war: each year during war growth is this much lower. Since we are now able to use a far larger sample of civil wars than that on which the previous analysis was based, the latter number seems the more reliable. Hence, the cost of war increases proportionately, to around 4.5 times GDP.

Natural shocks

The economic consequences of natural disasters have recently been studied by Benson and Clay (2004). Using a case-study and qualitative approach, they conclude that 'major natural disasters can and do have severe negative short-run economic impacts' (p1). Evidently, the method used in our study complements this approach.

We find mixed evidence of the importance of natural disasters for growth, although they may, of course, have serious implications for other dimensions of wellbeing. Geological shocks significantly reduce growth by around one percent. Climatic shocks have no significant effects in the year of the shock but in the subsequent year (and the fourth year) there is a gain of 0.68 and 0.59 percent. That climatic shocks actually augment growth may be due to donor responses. Eisensee and Stromberg (2005) find that disaster relief is highly sensitive to the extent of media coverage with some types of shock such as

earthquakes being particularly media-friendly. Humanitarian shocks do not appear to have significant growth effects.

Long-run effects

Our co-integration approach enables us to look for long-run effects in addition to short run effects. Potentially, this is an advantage of the approach over the VAR approach followed by Deaton and Miller (1995). We find a significant long-run effect of the level of commodity prices on the level of income. This is not, of course, a fully-specified structural relationship. It is highly reduced form and at most tells us that something significant is going on in the long run over-and-above the more explicitly modelled short run relationship. This in turn is dependent upon cointegration between the level of GDP and the level of commodity prices. By Granger's theorem, since the coefficient on the cointegrating relationship is significant, this implies that the variables within the relationship are indeed cointegrated. Given the ragged nature of our panel it is difficult to see whether this is supported by other tests.

The issue is important because our results imply that the long-run relationship is not only significant, but *negative*. If this is correct, it tells us that regardless of any short-run dynamics, over a sufficiently long period an increase in commodity prices reduces the level of income. Since the short-run dynamics are positive, this implies that there is some 'offstage' impact on growth beyond the three-year post-shock period that the short-run dynamics model. The speed of adjustment implied by the coefficients on the long-run relationship is slow, at around 3% per year. Thus, it will only have fully worked through the system after three or four decades. A lower-bound implication of a significant negative coefficient is that the short-run positive effects are fully offset by slower growth later: what goes up comes down. In the case study literature this is a common phenomenon and has been termed 'unsustainable growth', where what is unsustainable is not the growth rate, but the growth in output (Collier and O'Connell, 2006). However, even this would flatter the consequences of a commodity boom. The economy ends up not merely losing all the initial gains but far worse. Recall that a 10% increase in

commodity prices raises GDP cumulatively over the subsequent three years by around 1.0%. By contrast, taking the long view, eventually this increase in commodity prices will lower GDP by 2.2%. So, the short run effect is not merely the opposite of the long run effect, but it is the minor part of the story. The adverse long run effect is consistent both with various theories by which commodity rents undermine the growth process, for example, the 'voracity effect' (Lane and Tornell (1999) and with the case study literature on trade shocks (Collier and Gunning, 1999).

Effects due to volatility

Before considering these effects further, we introduce the risk of these shocks, measured as discussed in Section 3. Both microeconomic theory and evidence from low-income households suggest that risk may be an important impediment to growth. Microeconomics emphasizes the costs imposed on liquidity-constrained agents by volatility, and their consequent willingness to sacrifice expected income for expected utility (Dercon, 2004). Potentially, in low-income countries the predominance of such agents implies that volatility is as or more damaging than the actual realization of the shocks. Alternatively, these household-level risks are insufficiently covariant to scale up to macroeconomic phenomena (Collier, 2004).

We find that none of these risks is significant at conventional levels. Even when fixed effects are dropped, which biases the results towards finding an effect, risks remain insignificant. Our provisional conclusion is that macroeconomic shocks matter because of their direct effects rather than through the more insidious costs associated with 'coping strategies'.

4. Vulnerability due to Economic Structure

We now investigate how the effects of shocks are moderated or amplified by various structural characteristics of the economy: its level of per capita income, its population, and its growth rate prior to the shock. The growth rate is evidently not entirely a

'structural' variable. Differences in growth rates will reflect both fundamental differences in opportunities, such as whether a country is landlocked, its institutions, and also its short-term choices. Nevertheless, fast-growing economies tend to share certain quasi-structural features, such as a high rate of investment, which may directly affect the capacity of an economy to respond to a shock. We consider these three characteristics in turn. Many of the interactions are significant, but only for some of the three post-shock years that we investigate. Generally, we are more interested in the net effect over the full period than in its phasing, although we not when the difference appears to occur.

Level of income

The interaction with the level of income is evidently of considerable importance. The consequences of a shock for the global economy depend almost exclusively upon whether shocks affect the high-income countries, whereas the consequences for poverty depend almost exclusively upon whether they affect low-income countries. Thus, shocks could be important for either one without being important for the other: there need be no 'common interest'.

We begin with the international shocks. Both for exports and for oil imports the interactions between income and favourable shocks are significant. Low income countries gain more from a given export price shock than high-income countries. If export prices rise by 10% then a one-standard deviation reduction in per capita income increases the growth effect of the period following the shock by 0.22 percentage points (in t+3). Similarly, in the case of favourable oil shocks, higher income countries gain less. If income is one standard deviation lower, a ten percent decline in oil prices adds 0.21% more to income (in year t+2). Hence, from the perspective of development, these interactions are benign: low-income countries are advantaged.

For internal shocks we find the opposite. In particular, for both climatic and humanitarian shocks low-income countries are hit harder than high-income countries. The disadvantage of low-income countries in respect of climatic shocks is eliminated once we control for

policies for structural flexibility. This implies that on average, low-income countries adopt policies that make them better able to cope with climatic shocks, presumably because they are more susceptible to them. Geological shocks are an exception: high-income countries are hit differentially hard. This is presumably because the main channel of damage is the destruction of capital and there is more capital to be destroyed.

Size

We might expect size to dampen shocks, whether external or internal. Starting with the external, larger countries are less affected by export price shocks, gaining significantly less from positive shocks and losing significantly less from adverse shocks. If the country has a one standard deviation smaller population, the growth-enhancing effect of a doubling of export prices is increased by 2.6% in t+1, and by 3.9% in t+2. Conversely, the same country suffers a 1.8% larger growth loss (t+2) if export prices halve. However, these are dependent upon the sample. The addition of our measures of flexibility, discussed below, reduces the sample by around a third. This sample-reduction effect eliminates the significance of population size. Similarly, for oil shocks once again the sample-reduction effect means that we can only study the effect of size in the absence of controls for flexibility. Countries with larger populations gain more from a fall in the oil import price and lose more from an increase. A one-standard deviation increase in the population amplifies the responses to halving and doubling of oil prices by 1.4% (t+2) and 1.1% (years t and t+2) respectively. Possibly, countries with larger populations have longer internal transport routes and so have higher consumption of oil per capita.

As to the internal shocks, as might be expected both climatic and humanitarian shocks have smaller consequences for growth in populous countries. Thus, to summarize, small countries are differentially badly affected by export price shocks, climatic shocks and humanitarian shocks. Combining these results with those for interactions between shocks and income, two types of shocks are differentially important for countries that are both small and poor: the characteristics typical of Africa. These are climatic and humanitarian shocks. To clarify, this is completely distinct from the evident point that such shocks tend

to be more *frequent* in countries that are small and poor. Our result is that a given shock has differentially large effects in such countries.

Growth rate

The next structural variable we investigate is the growth rate, introduced with a lag. The growth rate amplifies the effect of shocks. We compare an economy that has been growing at 5% with one that has been stagnant and face them with the same shocks (this being a one-standard deviation difference). If export prices double, the fast growing economy gains by 2.5% more than the stagnant economy (in year t+2). Conversely, if export prices halve, the fast-growing economy loses 3.2% more in year t, and a further 3.2% in year t+2. The effect of oil shocks is similar, although only favourable oil shocks are now significant. Fast-growing economies get their growth amplified by an additional 2.8% (t+2) when the oil price halve. Fast-growing countries also tend to lose more from a humanitarian shock.[5]

There are thus three significant interactions with growth, all amplifying the effect of the shock. These amplification effects may help to explain why high growth appears to come in 'spurts' rather than being sustained (Hausmann et. al., forthcoming). Favourable external shocks flatter the more rapid growers into 'spurts' which are then arrested by adverse shocks.

5. Domestic Policies: Exposure, Adaptation and Precaution.

We now turn to policy. We focus on a four clusters of policies. The first affects exposure to international shocks, namely the chosen degree of openness. The second affects the capacity of private agents to respond to shocks, and can be thought of as 'flexibility'. The

[5] Fast-growing countries appear to lose significantly less from a civil war. However, this is very likely spurious. Growth reduces the likelihood of a war, (Miguel *et al*., 2004, Collier and Hoeffler, 2004). Hence, the most likely interpretation of the result is that faster growth also reduces the scale of any war that does break out.

capacity to respond is influenced partly by the speed of price responses and partly by reallocations of capital and labour. The policies that address these three responses are exchange rate flexibility, the depth of financial markets and the extent of rigidities in labour markets. Collectively, these can be thought of as policies towards flexibility.
The third is a range of quasi-insurance instruments, and can be thought of as 'precautionary'. The fourth is the 'meta-policies' that shape political institutions and social structures.

5.1. *The Chosen Exposure to External Shocks: Trade Policy*

Our investigation of openness controls for population size and per capita income and is thus a proxy for trade policy and related policy-related potential impediments to trade such as variations in the infrastructure for international trade.

We might expect that an open economy would increase its exposure to external shocks but reduce its exposure to internal shocks. Taking the two external shocks first, open economies benefit less from positive export price shocks. A doubling of export prices increases growth by 3.6% less in t+3 if the economy is one standard deviation more open. They also lose more from oil shocks, although the effect is not large. A one standard deviation increase in openness amplifies the growth loss of a doubling of the oil price by 1%. While a more open economy is evidently more exposed to a given international price shock, the more restrictive is trade policy the higher is the shadow price of foreign exchange. Hence, in such an economy a favourable external shock augments a highly valuable resource. Since these two effects are qualitatively offsetting, the net effect of openness on the growth effects of an external shock is *a priori* ambiguous.

By contrast, the consequences of internal shocks are unambiguously dampened by openness. More open economies are less damaged by both climatic shocks and humanitarian shocks. Hence, continuing with our particular concern for small, low-income countries, since these are differentially hard hit by precisely the two internal

shocks which are cushioned by openness, such economies should differentially adopt liberal trade policies.

5.2. *Policies for adaptability*

Exchange rate flexibility

Using the IMF classification system of de facto policy regimes, we group countries into those with fixed rates and those with systems that permit some degree of flexibility. In theory, flexible exchange rates should ease adjustment to external shocks, but reduce the cushioning of internal shocks.

Taking first the external shocks, for export price shocks we find that the effect is asymmetric: flexibility reduces the cost of adverse shocks but does not enhance positive shocks. Countries with flexible exchange rates suffer less in the year after an adverse shock. If export prices halve in year t, in year t+1 a country with a fixed exchange rate will have a growth rate that is 4.7% lower than a country with a more flexible exchange rate. While this is an enormous effect, there is weak evidence that flexibility in the exchange rate shifts the pain of a shock rather than reducing it: countries with fixed exchange rates have a positive but insignificant in the year of the shock.

For an unfavourable oil shock a flexible exchange rate increases the losses, with growth lower in t+3 by 2.2%. For a favourable shock the flexible economy gains more, by 4.9% (t+1). Thus, exchange rate flexibility amplifies the oil shocks but with a net favourable effect since the gains are more than double the losses. This is plausible since the difference in exchange rate regime amounts to a decision whether or not to cushion the oil price by means of reserves. The cushioning is effective but costly.

For two of the internal shocks flexible exchange rates have significant effects, namely for wars and for coups. In both cases flexibility amplifies the adverse effect.

Exchange rate flexibility thus has overall ambiguous effects on the management of shocks. It dampens export price shocks but amplifies oil price shocks. This seemingly paradoxical result is, however, consistent with basic economic theory. When export prices fall a flexible exchange rate cushions exporters, spreading the cost across the economy as importers pay exporters more in domestic currency for foreign currency. In contrast, when oil prices rise a flexible exchange rate augments the shock to oil consumers: it is a fixed exchange rate that diffuses the costs across all taxpayers. It also amplifies the effect of political shocks. Perhaps the capital flight that is a likely response to these shocks is more strongly transmitted onto the economy if the exchange rate is flexible.

Given these offsetting effects, can we say anything about which types of economy are more or less suited to exchange rate flexibility? Combining these results with the previous ones, three characteristics make a country more suited to exchange rate flexibility: a small population, fast-growth, high trade barriers and low political risks. Each of the first three characteristics makes a country more sensitive to a fall in export prices, which is what exchange rate flexibility is good at dampening. Small size and high trade barriers aptly describe many low-income countries. Rapid growth does occur, even in Africa, although there it is recent. Evidently, at present export prices are high for most of these countries. Prior to the next downturn in these prices there is a case for introducing a greater degree of exchange rate flexibility. However, many of these countries also have relatively high political risks. There is therefore a case for combining exchange rate flexibility with some additional policy instrument such as security guarantees, that directly reduces political risk.

Credit market depth

We measure the depth of the credit market by financial depth (M2/GDP). We might expect financial depth to make all shocks easier to handle.

Financial depth indeed reduces the impact of adverse export shocks. A reduction in financial depth of one standard deviation increases the growth loss from a halving of the export price in year t+2 by 3.6%. Unlike our other measures of flexibility, financial depth has symmetrical effects. In the third year after a doubling of the export price (t+3) the growth rate is reduced by 4.9%. Note that the effects of financial depth are more heavily lagged than those of the labour market and the exchange rate. This is unsurprising, since a credit market enables shocks to be spread.

Only those oil shocks that are adverse are significant. A deep credit market amplifies the adverse effect. A one standard deviation deepening in the market increases the loss of growth from a doubling of the oil price by 1.2%. Interestingly, this is an impact effect (year t), in contrast to the dampening effects of export price shocks, where the beneficial effects are heavily lagged. One possible explanation for this is that whereas export price shocks are fairly country-specific, oil import price shocks are coincident. Countries with deep financial markets are more likely to be exposed to foreign borrowing and may suffer an impact effect in which international investors take flight and this squeezes credit and through that the economy. Fortunately, the effect is not particularly large.

Financial depth also significantly reduces the costs of coups and earthquakes. However, it has opposite effects in respect of civil war. There is some evidence that civil war induces the government to resort to predation of the financial sector through crowding out since this is an easy way of raising large extra resources. In this case financial depth prior to war exposes the private sector to increased predation.

What characteristics make a country most-suited to financial depth? While there are many significant effects, they are contrary. The only clear result is that countries that are particularly exposed to export price shocks would benefit from deepening their financial markets.

Labour market flexibility

We measure the rigidity of employment using the 'Doing Business' surveys of the World Bank. We find that societies with more rigid labour markets are hit significantly harder by a given export price shock. The effects are asymmetric: labour market rigidities are not significant in the response to positive export shocks but, with a lag, make adverse shocks worse. If in year t export prices halve, in year t+1 the less flexible is the labour market the larger is the growth loss from the shock. The effect is large: a one-standard deviation greater degree of rigidity reduces growth in year t+1 by 2.2%. Turning to the other external shocks, only those oil shocks that are favourable are significant. A country with a one standard deviation reduction in flexibility benefits less from a halving in the oil import price, by 2.2% (t+2).

Turning to the internal shocks, greater flexibility in labour markets significantly reduces the cost of geological and climatic shocks.

Hence, labour market flexibility is the one dimension of flexibility that is unambiguously beneficial across both external and internal shocks with no offsetting effects.

Summary on Policies for Structural Adaptability

Policies towards flexibility matter more for coping with adverse export price shocks than for favourable ones. Indeed, all the growth effects of adverse export price shocks come via interactions with the extent of three dimensions of flexibility: labour markets, credit markets, and exchange rate markets.

In combination these results suggest that flexibility is enormously important for the ability to cope with adverse shocks. A country which has a flexible exchange rate, and a one-standard deviation above average degree of flexibility in its labour and credit markets will, over the period of the shock, gain around 10.5% of GDP relative to one with fixed exchange rates and average flexibility. Recall that we found that before introducing these

interaction effects the average effect of a halving of export prices over the period of following the shock would be around 10% of GDP. Hence, our results suggest that a flexible economy can avoid all of these substantial costs. This is consistent with our results from adding the interaction terms since the direct effect ceases to be significant.

5.3. *Precautionary policies*

Reserves prior to the shock

We next investigate the effect of the size of reserves relative to GDP prior to the shock (t-1).

Larger reserves reduce the cost of negative export price shocks and increase the gains from favourable export price shocks. Both effects occur only with a long lag, in period t+3. The former effect is readily intelligible: prior reserves enable greater cushioning. The latter effect is more likely to be a proxy for a disposition to prudence and hence a greater willingness to stretch the windfall over a longer period. Other than this, large reserves reduce the cost of humanitarian shocks but increase the cost of a geological shock, the latter having no very obvious explanation other than perhaps through dampening donor enthusiasm for assistance.

Debt

Debt unambiguously dampens favourable shocks. Both when oil prices fall and when export prices rise, high indebtedness reduces the growth impact, presumably because creditors are taxing the windfall. For adverse international shocks the effects of debt are less clear. For oil shocks high indebtedness worsens the decline in growth, whereas for adverse export shocks it actually improves responses. Possibly, high indebtedness is proxying a greater willingness to borrow in the event of an adverse shock, which is feasible in the case of the more idiosyncratic export shocks, but infeasible in the case of the synchronized oil shocks.

Fiscal Deficit

The larger the fiscal deficit prior to the shock, the worse are the consequences of an adverse export price shock. This occurs both on impact (year t) and with a lag (period t+2). A celebrated example of a well-managed negative shock is Botswana's response to the pause in diamond exports in 1980 (Hill and Knight, 1999). This was helped by the prior strong position of Botswana's finances which enabled deficit financing to be credible. However, the opposite is the case for adverse oil shocks. Large deficits make both climatic and humanitarian shocks worse.

Recall that so far we have found that for small, low-income economies, since they are particularly vulnerable to climatic and humanitarian shocks flexibility in labour markets and depth in credit markets is helpful. We can now add that the precautionary policies are also helpful. High reserves, low debt, low deficits, and large remittances all significantly soften the impact of a decline in export prices.

5.4. *Shocks and Socio-Political Systems*

Evidently, the consequences of shocks are strongly affected by the policy choices of governments, both adaptive and precautionary. Since these choices are made through some political process it is therefore of interest to determine whether particular political and social structures facilitate or hinder responses to these responses. As with the policies themselves, we measure the political systems and social structures just prior to the shock.

We first consider democracy. Since the Polity IV index is ordinal, the correct way to use it is through dummy variables that partition it into groups. However, at this preliminary stage in our analysis we retain all the information and treat the index as though it were cardinal.

Democracy acts like insurance in response to export price shocks, dampening the growth consequences of both favourable and unfavourable shocks. It has precisely the opposite

tendency in respect of oil import shocks, amplifying both favourable and unfavourable shocks. Possibly, the pertinent political difference between these two external shocks is that export shocks have a defined group that are directly affected so that redistribution is effective as insurance, whereas the oil shocks are highly diffused and so the only redistribution that the government can attempt is inter-temporal. Such responses risk being populist and so can have preserve effects. As to the internal shocks there is only one significant interaction effect: democracies increase the growth cost of climatic shocks. This comes quite close to contradicting the famous thesis of Sen (1981).

Democracy comes in several different designs. One distinction that is often found to be important is that between presidential and parliamentary systems. Presidential systems concentrate power and so offer the potential for rapid responses to crises, but this comes at the price of weaker checks and balances, and a weakening of the power of those interest groups that gain a degree of veto power in a parliamentary system. We find that parliamentary systems are associated with larger adverse consequences of internal shocks: geological shocks, coups and wars all have worse consequences in parliamentary systems. This is consistent with the notion that the greater cohesion in a presidential system facilitates responses to shocks. The external shocks show a confusing pattern: parliamentary systems amplify the short term gains from lower oil prices, but dampen the short term gains from export booms.

We next investigate the effect of checks and balances, using the Knack and Keefer measure which simply counts how many of seventeen possible checks and balances apply in the society. In previous work we have found that checks and balances significantly improve the growth performance of resource-rich economies, although that analysis is not specific to shocks (Collier and Hoeffler, 2005). Here we find that checks and balances significantly dampen the consequences of export price booms. In the short term this lowers the returns to a boom. However, there is a reasonable presumption that dampening booms contributes to the long term growth of the economy, so there is quite possibly an off-stage benefit to checks and balances.

Our final political variable is elections. To an extent elections may be endogenous to shocks and at this stage we control for this by considering only elections that take place in the year of the shock. Our presumption is that in half of these cases the election will just have preceded the shock, and in the other half it will follow so soon that it cannot reasonably have been endogenous: elections take time to organize. There remains the possibility that in the aftermath of really severe shocks elections might get postponed. In this case elections would spuriously proxy smaller shocks. Such a possibility is much more likely for major natural disasters than for the economic shocks. Since none of the interactions between elections and natural disasters is significant, any such effect appears to be too small to be of concern. Since in most countries elections occur on a cycle of around five years, an election in the year of the shock essentially indicates that in the period under analysis any policy responses are free of concerns about an imminent election. Hence, somewhat paradoxically, our introduction of the elections variable proxies government *freedom from the need to fight an election* during the post-shock period that we consider. Three interactions are significant, all with external economic shocks. Two of the interactions concern favourable oil shocks. In both t+1 and t+3 the resulting boom is amplified by the interaction with elections. The other interaction concerns favourable export shocks. Here we find that in t+2 the election has a dampening effect. It is evidently difficult to reconcile these results.

We also investigate the effect of ethnic diversity. Rodrik has proposed that ethnically diverse societies are likely to be less able to cope with adverse shocks because they face greater problems of collective action in the face of adversity. Our results on export price shocks do not support this hypothesis: fractionalized societies seem to fare better from both negative and positive shocks. In respect of oil shocks look more consistent with Rodrik's thesis: fractionalization amplifies both favourable and adverse oil shocks. It also amplifies the effect of climatic shocks.

6. External Assistance for Shocks

External assistance for shocks is no longer overwhelmingly the preserve of the public sector. The rise in remittances to developing countries now provides a direct household-to-household transfer on a scale commensurate with aid flows. We therefore consider them both.

Remittances prior to the shock

Potentially remittances serve as a form of private insurance: in response to shocks remitters are likely to increase payments. Because of this endogeneity, the flow of remittances during shocks cannot be used as an explanatory variable: it is likely to proxy the scale of the shock. Rather than instrument for it, at this stage we assume that the response to shocks is broadly proportional to the pre-shock scale of remittances.

We find that high remittances prior to the shock significantly reduce the costs of adverse export price shocks (t, t+1), and conversely, significantly reduce the benefits of favourable export shocks (t+2). This is fully consistent with an insurance element to remittances. Oil shocks do not have this property: indeed, with an adverse oil shock remittances compound the decline. This is presumably because most remitters work in countries which are themselves adversely affected by these shocks so that the income of remitters declines. Remittances also significantly reduce the growth costs of earthquakes and coups, presumably because these events are high-profile and so remittance responses are particularly substantial.

Aid

The effect of aid as a cushion against shocks was previously investigated by Collier and Dehn (2001). However, aid is likely to be endogenous to shocks, a problem not controlled for in that study. Fortunately, there is now an established approach to instrumentation and we use it (Tavares, 2003). Since aid directly augments the potential

supply of tradable goods, we might expect that it would be more useful in alleviating external shocks than internal shocks. To date, the actual responses of aid have tended to have the opposite characteristics. Because geological, climatic and humanitarian shocks are all more photogenic than the adverse shocks due to declines in export prices and hikes in the price of imported oil, donors have responded to them more readily.

Our results bear out these priors. The interactions of aid with each of the adverse external shocks are favourable and significant. They are also substantial. In the onset year of an adverse export price shock an extra one percentage point of GDP in aid augments growth by 1.1% over and above any normal effect. Similarly, in the onset year of an adverse oil shock an extra one percent of GDP in aid augments growth by 0.8% over and above any normal effect. In contrast, none of the aid-shock interactions is significant for the internal shocks. Of course, aid may still be very important as a response to some shocks. Its primary purpose in humanitarian shocks is to raise consumption and improve health states. Nevertheless, there may be some case for switching aid from the internal shocks to the external since it is these for which aid is more effective.

Whether aid is switched from other uses, there is evidently some case for using some aid to cushion external shocks. As between export shocks and oil shocks there is some reason to favour the latter, in that private remittances appear to be effective at cushioning export shocks but actually amplify the oil shocks.

7. Conclusion

Do shocks matter? Very tentatively, we suggest that the importance of shocks is in approximately inverse proportion to the global attention they receive. The natural shocks do not seem to be especially important: they do not scale up from the micro, where they are hugely important, to the macro. The political shocks are far more important: even a coup, which is radically less costly than a war, costs around nine times as much as the most costly of the natural shocks. If our preliminary cointegration results prove to be robust, the costs from primary commodity exporting are very large indeed. However,

these costs may not be closely related to shocks: we find no evidence that volatility is a problem. Rather, the costs are arising from commodity exports may be due to rents.

To the extent that shocks matter, which types of country are most vulnerable? Evidently, one aspect of this is susceptibility to shocks: some countries are more likely to experience a drought than others. Since this is standard, in this paper we have focused on the other dimension of vulnerability: what happens if a shock occurs. Generally, the shocks that are differentially devastating in the small, low-income countries that are the proper focus of concern are climatic and humanitarian shocks.

What can a government do to moderate the adverse effects of negative shocks and to make the most of favourable shocks? The answer appears to be that governments can do a lot, partly through policies that alter exposure, partly through policies that encourage adaptation and flexibility, and partly by precautionary policies. Openness increases exposure to external shocks but moderates the consequences of internal shocks. Hence, for the small, low-income economies that are differentially badly affected by internal shocks, there is a case for differentially aggressive trade liberalization. Exchange rate flexibility and financial depth both improve the consequences of some types of shock. However, the policy towards adaptation that most systematically improves responses across different types of shock without any offsetting increases in risk is greater flexibility in the labour market. Precautionary policies also seem to be fairly systematically beneficial: countries at risk are better placed with lower levels of debt, smaller fiscal deficits, and larger reserves.

Does the political system matter? Although we find a number of significant effects, the pattern is far less clear than for the policies themselves. Whereas adaptive and precautionary policies appear to be systematically beneficial, there is less basis for general statements about democracy or its design features.

Finally, can international assistance help? The answer is a clear ‘yes’. Private remittance flows work like insurance and this is helpful, reducing the effects of some adverse shocks

at the price of reducing the benefits of favourable shocks. Given this effect of remittances, is there a need for aid also to have an insurance role, or would it merely duplicate? Evidently, to the extent that it duplicates, there is a danger that it would merely substitute for remittances: public money would replace rather than supplement private money, a phenomenon for which there is some evidence at the micro level. There is one clear case in which public money would not duplicate, namely oil shocks. When oil prices increase, reliance upon remittances makes the adverse shock worse. We have suggested that this is because generally the earnings of remitters themselves tend to get squeezed. Aid at such a time is, however, super-effective: it augments growth in the year of receipt approximately dollar-for-dollar with the aid, over-and-above any normal effects of aid. Hence, there is a reasonable case for an oil facility in the low-income, oil-importing economies.

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Table 1: The Impact of Shocks on Growth

Independent variables:	(1)	(2)
Ln(GDP per capita)		
First-difference year t-1	0.25***	0.28***
	(0.04)	(0.03)
First-difference year t-2	0.03	0.05**
	(0.03)	(0.02)
First-difference year t-3	0.06**	0.03*
	(0.02)	(0.02)
Level year t	-0.04***	-0.04***
	(0.01)	(0.00)
Ln(Export price)		
First-difference year t	0.03***	
	(0.01)	
First-difference year t-1	0.03***	
	(0.01)	
First-difference year t-2	0.01**	
	(0.01)	
First-difference year t-3	0.00	
	(0.01)	
Level year t	-0.01*	
	(0.01)	
Ln(Oil import price)		
First-difference year t	0.00	0.00
	(0.00)	(0.00)
First-difference year t-1	-0.01**	-0.01***
	(0.00)	(0.00)
First-difference year t-2	-0.00	-0.01*
	(0.00)	(0.00)
First-difference year t-3	-0.00	-0.01**
	(0.00)	(0.00)
Level year t	-0.00**	-0.00
	(0.00)	(0.00)
Ln (Oil export price)		
First-difference year t		0.02***
		(0.01)
First-difference year t-1		0.01
		(0.01)
First-difference year t-2		0.01*
		(0.01)
First-difference year t-3		0.00
		(0.01)
Level year t		-0.00
Coup year t	-0.03***	-0.04***
	(0.01)	(0.01)
War year t	-0.03***	-0.03***
	(0.01)	(0.01)
Geological shock year t	-0.01**	-0.01**
	(0.00)	(0.00)
Climatic shock		
year t	-0.00	-0.00
	(0.00)	(0.00)
year t-1	0.01***	0.01***
	(0.00)	(0.00)
year t-2	0.00	0.00
	(0.00)	(0.00)
year t-3	0.01**	0.01***
	(0.00)	(0.00)
Humanitarian shock year t	-0.01	-0.01
	(0.01)	(0.01)
R-squared within	0.16	0.18
Observations	4075	5123

The dependent variable is the first-differenced log of real GDP per capita in year t. Country-specific fixed effects included. Robust standard errors clustered by country are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels.

Table 2: The impact of shocks for different income, size, and past growth

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Export price POS	0.039						
	(0.809)						
L.	0.460						
	(0.000)***						
L2.	0.210						
	(0.208)						
L3.	0.076						
	(0.591)						
Export price NEG	0.004						
	(0.978)						
L.	-0.012						
	(0.933)						
L2.	-0.234						
	(0.012)**						
L3.	0.092						
	(0.558)						
Export price level	-0.007						
	(0.206)						
Oil import price		0.016					
POS		(0.738)					
L.		-0.05					
		(0.409)					
L2.		0.10					
		(0.07)*					
L3.		-0.02					
		(0.66)					
Oil import price		-0.076					
NEG		(0.351)					
L.		-0.09					
		(0.057)*					
L2.		0.02					
		(0.787)					
L3.		-0.04					
		(0.06)					
Oil import price		-0.007					
level		(0.001)***					
Coup			-0.131				
			(0.124)				
War				-0.285			
				(0.035)**			
Geological shock					-0.043		
					(0.509)		
Climatic shock						-0.046	
						(0.094)*	
L.						-0.017	
						(0.424)	
L2.						-0.006	
						(0.806)	
L3.						-0.013	
						(0.543)	
Humanitarian shock							0.120
							(0.213)
Income*Export	0.019						
Pr POS	(0.136)						
L.	-0.023						
	(0.011)**						
L2.	0.010						
	(0.513)						
L3.	-0.013						
	(0.249)						
Income*Export	-0.001						
prNEG	(0.941)						
L.	-0.014						
	(0.189)						
L2.	0.010						

	(0.268)				
L3.	-0.005				
	(0.639)				
Income*Oil pr POS		0.007			
		(0.055)*			
L.		0.002			
		(0.717)			
L2.		-0.007			
		(0.124)			
L3.		-0.005			
		(0.154)			
Income*Oil pr NEG		0.012			
		(0.074)*			
L.		0.007			
		(0.081)*			
L2.		-0.007			
		(0.140)			
L3.		0.005			
		(0.005)			
Income * Geo					0.003
					(0.519)
Size * Export prPOS	-0.010				
	(0.271)				
L.	-0.015				
	(0.002)***				
L2.	-0.016				
	(0.106)				
L3.	0.002				
	(0.805)				
Size * Export	-0.001				
prNEG	(0.813)				
L.	0.006				
	(0.391)				
L2.	0.009				
	(0.048)**				
L3.	-0.004				
	(0.611)				
Size * Oil pr POS		-0.004			
		(0.110)			
L.		0.002			
		(0.451)			
L2.		-0.002			
		(0.464)			
L3.		0.003			
		(0.002)			
Size * Oil pr NEG		-0.001			
		(0.708)			
L.		0.002			
		(0.325)			
L2.		0.003			
		(0.304)			
L3.		0.00			
		(0.983)			
Size * war				0.007	
				(0.233)	
Size * geo					0.001
					(0.810)
Past growth*	0.033				
ExpPOS	(0.879)				
L.	0.069				
	(0.749)				
L2.	0.413				
	(0.006)***				
L3.	-0.048				
	(0.748)				
Past growth*	-0.396				
ExpNEG	(0.117)				
L.	-0.151				
	(0.671)				
L2.	0.492				

	(0.026)**						
L3.	-0.263						
	(0.148)						
Past growth*		-0.159					
Oil POS		(0.115)					
L.		-0.190					
		(0.208)					
L2.		0.025					
		(0.742)					
L3.		0.079					
		(0.443)					
Past growth*		-0.467					
Oil NEG		(0.009)***					
L.		-0.037					
		(0.788)					
L2.		0.563					
		(0.002)***					
L3.		-0.184					
		(0.080)*					
Past growth* Coup			-0.111				
			(0.513)				
Past growth* War				0.181			
				(0.015)**			
Past growth* Geo					0.034		
					(0.803)		
Past growth*Clim						0.009	
						(0.888)	
L.						0.033	
						(0.517)	
L2.						0.013	
						(0.763)	
L3.						-0.028	
						(0.457)	
Past growth* Hum							-0.189
							(0.075)*
Income * Coup			0.005				
			(0.555)				
Income * Hum							-0.000
							(0.955)
Size * Hum							-0.008
							(0.091)*
Income * Clim						0.004	
						(0.131)	
L.						0.002	
						(0.351)	
L2.						-0.00	
						(0.791)	
L3.						-0.00	
						(0.550)	
Size * Clim						0.001	
						(0.361)	
L.						0.00	
						(0.546)	
L2.						0.001	
						(0.375)	
L3.						0.002	
						(0.025)**	
Income * War				0.019			
				(0.023)**			
Size * Coup			0.004				
			(0.168)				
Observations	3065	3841	3170	3170	3170	3065	3170
Number of id05	128	148	136	136	136	128	136
R-squared	0.150	0.132	0.142	0.145	0.133	0.123	0.133

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 3: Structural Policies and Shocks

(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Export pr POS	-0.082		0.024	0.024	0.024	0.024	0.024
	(0.646)		(0.019)**	(0.013)**	(0.014)**	(0.016)**	(0.018)**
L.	0.349		-0.322	-0.029	0.031	0.028	0.030
	(0.104)		(0.002)***	(0.005)***	(0.002)***	(0.005)***	(0.004)***
L2.	0.160		0.016	0.019	0.016	0.002	0.020
	(0.252)		(0.174)	(0.143)	(0.202)	(0.075)*	(0.194)
L3.	0.196		0.007	0.007	0.005	0.002	0.005
	(0.381)		(0.596)	(0.572)	(0.634)	(0.860)	(0.663)
Export pr NEG	-0.085		-0.028	-0.030	-0.025	-0.023	-0.023
	(0.724)		(0.040)**	(0.029)**	(0.068)*	(0.094)*	(0.094)*
L.	0.057		-0.028	-0.031	-0.026	-0.025	-0.026
	(0.768)		(0.010)***	(0.006)***	(0.017)**	(0.024)**	(0.014)**
L2.	0.156		-0.005	-0.048	0.028	-0.005	-0.002
	(0.350)		(0.644)	(0.67)	(0.803)	(0.385)	(0.816)
L3.	0.124		0.008	-0.009	-0.008	-0.010	-0.007
	(0.639)		(0.541)	(0.500)	(0.552)	(0.462)	(0.576)
Export pr level	-0.000		-0.005	-0.003	-0.005	-0.002	-0.005
	(0.989)		(0.388)	(0.548)	(0.349)	(0.780)	(0.576)
Oil import POS	0.005	-0.044	0.007	0.009	0.009	0.009	0.008
	(0.468)	(0.714)	(0.266)	(0.177)	(0.210)	(0.210)	(0.231)
L.	-0.003	0.072	-0.006	-0.006	-0.006	-0.002	-0.006
	(0.631)	(0.528)	(0.416)	(0.406)	(0.387)**	(0.979)	(0.404)
L2.	0.004	0.126	0.007	0.008	0.006	0.005	0.008
	(0.629)	(0.319)	(0.243)	(0.240)	(0.209)	(0.385)	(0.211)
L3.	-0.001	0.085	0.005	-0.004	-0.003	-0.002	-0.002
	(0.851)	(0.379)	(0.330)	(0.439)	(0.529)	(0.493)	(0.642)
Oil import NEG	0.012	-0.046	0.009	0.011	0.009	0.012	0.009
	(0.088)*	(0.682)	(0.241)	(0.130)	(0.221)	(0.115)	(0.208)
L.	0.012	-0.079	-0.012	0.014	0.011	0.010	0.013
	(0.109)	(0.460)	(0.077)*	(0.053)*	(0.127)	(0.133)	(0.059)*
L2.	0.014	-0.065	0.018	0.019	0.016	0.016	0.017
	(0.193)	(0.627)	(0.096)*	(0.086)*	(0.123)	(0.128)	(0.112)
L3.	-0.005	-0.170	0.007	-0.007	-0.007	-0.006	-0.008
	(0.627)	(0.908)	(0.476)	(0.454)	(0.529)	(0.493)	(0.375)
Oil pr level	-0.007	-0.006	-0.006	-0.006	-0.007	-0.007	-0.006
	(0.031)**	(0.012)**	(0.021)**	(0.021)**	(0.013)**	(0.025)**	(0.015)**
coup	-0.020	-0.020	-0.006	-0.019	-0.020	-0.021	-0.021
	(0.002)***	(0.001)***	(0.954)	(0.004)***	(0.004)***	(0.002)***	(0.003)***
war	-0.141	-0.134	-0.111	-0.220	-0.015	-0.013	-0.015
	(0.031)**	(0.061)*	(0.132)	(0.012)**	(0.028)**	(0.040)**	(0.028)**
Geological shock	0.096	0.081	0.010	0.002	0.328	-0.003	-0.007
	(0.221)	(0.230)	(0.888)	(0.981)	(0.049)**	(0.633)	(0.258)
Climatic shock	-0.007	-0.008	-0.006	-0.005	-0.006	-0.051	-0.061
	(0.016)**	(0.007)***	(0.054)*	(0.086)*	(0.054)*	(0.257)	(0.039)*
L.	0.006	0.005	0.005	0.031	0.041	-0.044	-0.044
	(0.011)**	(0.015)***	(0.032)**	(0.000)***	(0.012)***	(0.133)	(0.025)**
L2.	0.002	-0.001	0.002	0.019	-0.003	0.016	0.003
	(0.350)	(0.763)	(0.315)	(0.143)	(0.209)	(0.126)	(0.025)
L3.	0.005	-0.001	0.006	0.006	0.008	-0.006	-0.006
	(0.013)**	(0.006)***	(0.002)***	(0.002)***	(0.002)***	(0.493)	(0.002)***
Humanitarian shock	-0.011	-0.009	-0.008	-0.008	-0.008	-0.008	-0.610
	(0.205)	(0.287)	(0.353)	(0.347)	(0.325)	(0.310)	(0.009)***
Open	0.023	0.025	0.018	0.018	0.018	0.018	0.017
	(0.002)***	(0.000)***	(0.001)***	(0.000)***	(0.001)***	(0.010)***	(0.001)***
Open * exp pr POS	0.037						
	(0.198)						
L.	0.023						
	(0.453)						
L2.	-0.033						
	(0.401)						
L3.	-0.082						
	(0.010)**						
Open * exp pr NEG	-0.002						

	(0.943)						
L.	0.032						
	(0.294)						
L2.	-0.038						
	(0.121)						
L3.	-0.026						
	(0.397)						
Fixed ER regime	-0.009	-0.009	-0.008	-0.007	-0.009	-0.011	-0.009
	(0.063)*	(0.003)***	(0.010)**	(0.037)**	(0.008)***	(0.002)***	(0.007)***
Fixed ER regime	-0.055						
* exp pr NEG	(0.088)*						
L.	0.039						
	(0.125)						
L2.	0.044						
	(0.136)						
L3.	-0.004						
	(0.869)						
Fixed ER regime	-0.039						
* exp pr POS	(0.103)						
L.	0.015						
	(0.451)						
L2.	0.006						
	(0.797)						
L3.	0.007						
	(0.764)						
Financial depth	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.133)	(0.193)	(0.183)	(0.237)	(0.085)*	(0.038)**	(0.169)
Financial depth	-0.001						
* exp pr NEG	(0.214)						
L.	-0.000						
	(0.807)						
L2.	0.001						
	(0.018)**						
L3.	0.000						
	(0.877)						
Financial depth	-0.001						
* exp pr POS	(0.200)						
L.	0.000						
	(0.874)						
L2.	0.001						
	(0.081)*						
L3.	0.002						
	(0.003)***						
Financial depth *	-0.000	-0.000		-0.000			
war	(0.122)	(0.068)*		(0.173)			
Financial depth *	0.001	0.001			0.001		
Geo. shock	(0.014)**	(0.001)***			(0.016)**		
Labour rigidity*	0.000						
exp pr POS	(0.902)						
L.	-0.001						
	(0.352)						
L2.	-0.000						
	(0.895)						
L3.	0.000						
	(0.673)						
Labour rigidity*	-0.000						
exp pr NEG	(0.954)						
L.	-0.001						
	(0.071)*						
L2.	-0.000						
	(0.704)						
L3.	-0.000						
	(0.731)						
Open * oil pr POS		0.011					
		(0.507)					
L.		0.005					
		(0.737)					
L2.		-0.014					
		(0.302)					

L3.	-0.023		
	(0.066)*		
Open *	-0.022		
oil pr NEG	(0.246)		
L.	0.004		
	(0.805)		
L2.	0.005		
	(0.784)		
L3.	-0.001		
	(0.980)		
Fixed ER *	0.010		
oil pr POS	(0.480)		
L.	0.013		
	(0.309)		
L2.	0.009		
	(0.469)		
L3.	-0.022		
	(0.029)**		
Fixed ER *	-0.007		
oil pr NEG	(0.691)		
L.	0.049		
	(0.012)**		
L2.	0.019		
	(0.347)		
L3.	-0.003		
	(0.894)		
Fin depth *	-0.001		
oil pr POS	(0.068)*		
L.	0.000		
	(0.104)		
L2.	-0.003		
	(0.355)		
L3.	-0.000		
	(0.988)		
Fin depth *	-0.000		
oil pr POS	(0.446)		
L.	0.000		
	(0.425)		
L2.	-0.000		
	(0.808)		
L3.	-0.000		
	(0.933)		
Lab rigidity *	0.000		
Oil pr POS	(0.583)		
L.	0.000		
	(0.162)		
L2.	-0.000		
	(0.811)		
L3.	0.000		
	(0.502)		
Lab rigidity *	0.000		
oil pr NEG	(0.632)		
L.	-0.000		
	(0.249)		
L2.	-0.001		
	(0.006)***		
L3.	-0.000		
	(0.685)		
Open *			0.086
hum. shock			(0.030)**
Fixed ER * hum. shock			-0.001
			(0.963)
Fin depth *			-0.002
hum shock			(0.005)***
Lab rigidity *			0.000
hum shock			(0.367)
Open *		0.013	
climatic shock		(0.188)	
Fixed ER *		0.003	

climatic shock						(0.639)	
L.						0.010	
						(0.034)*	
L2.						0.005	
						(0.126)	
L3.						-0.005	
						(0.343)	
Fin depth *						0.000	
clim shock						(0.529)	
L.						0.000	
						(0.750)	
L2.						0.000	
						(0.438)	
L3.						0.000	
						(0.131)	
Lab. Rigidity *						-0.000	
climatic shock						(0.182)	
Open * geo shock					-0.028		
					(0.194)		
Fixed ER *					0.002		
geo shock					(0.904)		
Lab rigidity *					-0.001		
geo shock					(0.096)*		
Open * war				-0.028			
				(0.293)			
Fixed ER * war				-0.028			
				(0.009)***			
Lab. Rigidity *				0.001			
war				(0.137)			
Open * coup			-0.022				
			(0.173)				
Fixed ER * coup			-0.025				
			(0.063)*				
Fin depth * coup			0.001				
			(0.036)**				
Lab rigidity *			0.000				
coup			(0.237)				
Observations	2148	2618	2244	2244	2244	2148	2244
Number of id05	86	101	89	89	89	86	89
R-squared	0.179	0.157	0.145	0.147	0.133	0.140	0.133

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4A: Reserves and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.108	0.017	0.115	-0.055	-0.113	-0.30	-0.025	-0.106	0.170
	(0.559)	(0.935)	(0.236)	(0.738)	(0.341)	(0.034)**	(0.829)	(0.017)**	(0.376)
L.	0.442	0.216	-0.065	-0.122				0.0077	
	(0.007)***	(0.183)	(0.584)	(0.263)				(0.820)	
L2.	0.269	-0.275	0.234	0.077				0.017	
	(0.229)	(0.158)	(0.061)*	(0.587)				(0.724)	
L3.	0.404	0.214	0.112	0.048				0.016	
	(0.033)**	(0.257)	(0.322)	(0.738)				(0.665)	
Coef. Interact.	0.000	-0.001	-0.00	-0.00	-0.001	-0.0012	-0.00	-0.00	0.001
	(0.669)	(0.505)	(0.673)	(0.402)	(0.438)	(0.250)	(0.028)**	(0.645)	(0.027)**
L.	-0.001	0.000	0.002	0.00					
	(0.231)	(0.924)	(0.019)**	(0.407)					
L2.	-0.001	-0.000	0.00	0.00					
	(0.240)	(0.814)	(0.831)	(0.793)					
L3.	0.001	0.001	-0.001	0.00					
	(0.098)*	(0.287)	(0.195)	(0.745)					

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4B: Debt and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.062	0.210	0.071	-0.053	-0.095	-0.287	-0.02	-0.096	0.023
	(0.759)	(0.334)	(0.476)	(0.701)	(0.374)	(0.036)**	(0.835)	(0.028)**	(0.906)
L.	0.458	0.207	-0.204	-0.209				0.016	
	(0.007)***	(0.238)	(0.154)	(0.085)*				(0.641)	
L2.	0.132	-0.091	0.335	0.166				0.018	
	(0.653)	(0.602)	(0.005)***	(0.248)				(0.692)	
L3.	0.295	0.172	0.156	0.032				0.01	
	(0.128)	(0.401)	(0.127)	(0.834)				(0.778)	
Coef. Interact.	-0.001	-0.000	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00
	(0.003)***	(0.182)	(0.795)	(0.179)	(0.00)	(0.981)	(0.736)	(0.649)	(0.152)
L.	0.000	0.000	0.00	0.00					
	(0.798)	(0.415)	(0.001)***	(0.008)***					
L2.	0.000	0.000	-0.00	-0.00					
	(0.152)	(0.004)***	(0.068)*	(0.095)*					
L3.	0.000	-0.000	0.00	0.00					
	(0.353)	(0.619)	(0.363)	(0.132)					

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 4C: Deficit and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.068	0.018	-0.634	1.53	-0.052	-0.016	0.073	-0.0189	-0.247
	(0.910)	(0.987)	(0.273)	(0.050)**	(0.817)	(0.930)	(0.809)	(0.857)	(0.878)
L.	-1.566	-1.597	Dropped	0.45				-0.092	
	(0.021)**	(0.049)**		(0.654)				(0.293)	
L2.	-0.887	-0.890	Dropped	0.658				-0.057	
	(0.205)	(0.353)		(0.536)				(0.526)	
L3.	-0.047	-0.283	1.048	1.022				0.088	
	(0.950)	(0.768)	(0.282)	(0.394)				(0.342)	
Coef. Interact.	0.002	-0.013	0.011	-0.00	0.0036	-0.003	0.0023	-0.0023	-0.007
	(0.659)	(0.078)*	(0.033)**	(0.980)	(0.236)	(0.083)*	(0.376)	(0.021)**	(0.103)
L.	-0.002	0.001	0.012	-0.00					
	(0.767)	(0.871)	(0.230)	(0.998)					
L2.	0.0146	-0.011	0.00	-0.01					
	(0.043)**	(0.124)	(0.951)	(0.306)					
L3.	0.011	0.011	0.0085	0.00					
	(0.220)	(0.063)*	(0.078)*	(0.992)					

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5A: Democracy and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.127	-0.066	0.040	-0.083	-0.060	-0.304	-0.100	-0.128	0.120
	(0.539)	(0.728)	(0.493)	(0.343)	(0.560)	(0.009)***	(0.343)	(0.003)***	(0.380)
L.	0.281	-0.096	-0.084	-0.134				-0.042	
	(0.067)*	(0.560)	(0.398)	(0.099)*				(0.247)	
L2.	-0.048	-0.080	0.178	0.004				0.032	
	(0.846)	(0.627)	(0.036)	(0.967)				(0.343)	
L3.	0.266	0.075	0.082	-0.119				0.018	
	(0.042)**	(0.678)	(0.195)	(0.192)				(0.646)	
Coef. Interact.	-0.049	0.065	-0.026	0.002	-0.022	-0.0045	0.000	0.002	0.036
	(0.028)**	(0.004)***	(0.002)***	(0.901)	(0.525)	(0.714)	(0.986)	(0.679)	(0.025)**
L.	-0.044	0.032	0.014	0.041				-0.001	
	(0.014)**	(0.221)	(0.282)	(0.002)***				(0.866)	
L2.	-0.067	-0.001	-0.012	0.030				-0.008	
	(0.006)***	(0.978)	(0.149)	(0.092)*				(0.020)**	
L3.	0.008	-0.005	-0.008	0.013				-0.000	
	(0.681)	(0.815)	(0.410)	(0.619)				(0.910)	

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5B: Parliamentary System and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.292	-0.058	0.045	-0.113	-0.122	-0.219	0.006	-0.070	0.16
	(0.146)	(0.793)	(0.668)	(0.373)	(0.254)	(0.123)	(0.962)	(0.156)	(0.410)
L.	0.249	-0.078	-0.172	-0.089				0.047	
	(0.167)	(0.641)	(0.236)	(0.253)				(0.152)	
L2.	0.422	0.003	0.350	0.092				0.029	
	(0.119)	(0.985)	(0.005)***	(0.352)				(0.544)	
L3.	0.207	0.133	0.049	-0.046				-0.004	
	(0.383)	(0.428)	(0.625)	(0.572)				(0.903)	
Coef. Interact.	0.008	0.020	0.003	-0.007	-0.026	-0.022	-0.025	0.006	0.014
	(0.774)	(0.497)	(0.833)	(0.604)	(0.033)**	(0.104)	(0.038)**	(0.252)	(0.537)
L.	-0.047	0.043	-0.009	0.015					
	(0.114)	(0.132)	(0.612)	(0.309)					
L2.	-0.079	-0.034	0.036	0.052					
	(0.019)**	(0.265)	(0.014)**	(0.008)***					
L3.	-0.019	0.033	0.025	0.021					
	(0.480)	(0.165)	(0.116)	(0.143)					

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5C: Checks and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.444	-0.073	0.066	-0.081	-0.285	-0.282	0.045	-0.061	0.191
	(0.066)*	(0.734)	(0.577)	(0.515)	(0.016)**	(0.062)*	(0.714)	(0.223)	(0.261)
L.	0.314	-0.085	-0.139	-0.122				0.046	
	(0.176)	(0.651)	(0.282)	(0.130)				(0.160)	
L2.	0.361	-0.010	0.271	-0.011				0.019	
	(0.202)	(0.947)	(0.019)**	(0.902)				(0.694)	
L3.	0.182	0.073	-0.003	-0.071				-0.004	
	(0.468)	(0.633)	(0.977)	(0.375)				(0.918)	
Coef. Interact.	-0.008	0.004	-0/004	0.002	-0.01	-0.004	-0.003	0.001	0.016
	(0.379)	(0.672)	(0.243)	(0.744)	(0.032)**	(0.208)	(0.519)	(0.331)	(0.022)**
L.	-0.018	0.002	-0.00	0.005					
	(0.063)*	(0.880)	(0.980)	(0.276)					
L2.	-0.030	-0.013	-0.005	0.001					
	(0.000)***	(0.223)	(0.207)	(0.794)					
L3.	-0.009	0.003	0.002	0.003					
	(0.294)	(0.711)	(0.711)	(0.504)					

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5D: Elections and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.004	-0.007	0.073	-0.074	-0.08	-0.23	-0.068	-0.104	0.098
	(0.982)	(0.968)	(0.249)	(0.471)	(0.396)	(0.084)*	(0.416)	(0.004)***	(0.550)
L.	0.362	-0.119	-0.093	-0.099				-0.007	
	(0.012)**	(0.372)	(0.250)	(0.140)				(0.798)	
L2.	0.276	-0.136	0.156	-0.030				-0.006	
	(0.213)	(0.272)	(0.045)**	(0.672)				(0.04)	
L3.	0.286	0.091	0.071	-0.032				0.003	
	(0.092)*	(0.494)	(0.189)	(0.697)				(0.922)	
Coef. Interact.	-0.015	-0.029	0.004	-0.005	0.01	0.009	0.005	-0.002	0.012
	(0.381)	(0.200)	(0.667)	(0.724)	(0.341)	(0.289)	(0.569)	(0.715)	(0.207)
L.	0.003	0.012	0.007	0.022					
	(0.895)	(0.627)	(0.474)	(0.103)					
L2.	-0.055	-0.022	-0.010	0.001					
	(0.074)*	(0.342)	(0.269)	(0.940)					
L3.	0.026	-0.027	0.002	0.029					
	(0.373)	(0.282)	(0.778)	(0.028)**					

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6A: Remittances and Shocks

	Export price POS	Export Price NEG	Oil import price POS	Oil import price NEG	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Coefficient	-0.126	0.047	0.074	-0.122	-0.164	-0.250	-0.07	-0.113	0.121
	(0.524)	(0.805)	(0.383)	(0.444)	(0.124)	(0.056)*	(0.519)	(0.010)**	(0.511)
L.	0.484	0.083	-0.206	-0.158				0.006	
	(0.003)***	(0.618)	(0.083)*	(0.083)*				(0.871)	
L2.	0.322	-0.246	0.274	0.108				0.003	
	(0.179)	(0.101)	(0.011)**	(0.342)				(0.948)	
L3.	0.397	0.293	0.030	0.076				0.003	
	(0.028)**	(0.095)*	(0.775)	(0.526)				(0.931)	
Coef. Interact.	0.001	0.001	-0.001	-0.00	0.001	0.002	0.001	0.000	0.001
	(0.738)	(0.358)	(0.288)	(0.593)	(0.014)**	(0.222)	(0.004)***	(0.355)	(0.339)
L.	0.001	0.004	0.001	0.000					
	(0.694)	(0.000)***	(0.096)*	(0.640)					
L2.	-0.002	0.001	-0.001	0.000					
	(0.448)	(0.172)	(0.002)***	(0.926)					
L3.	0.002	0.002	0.000	0.000					
	(0.349)	(0.135)	(0.982)	(0.947)					

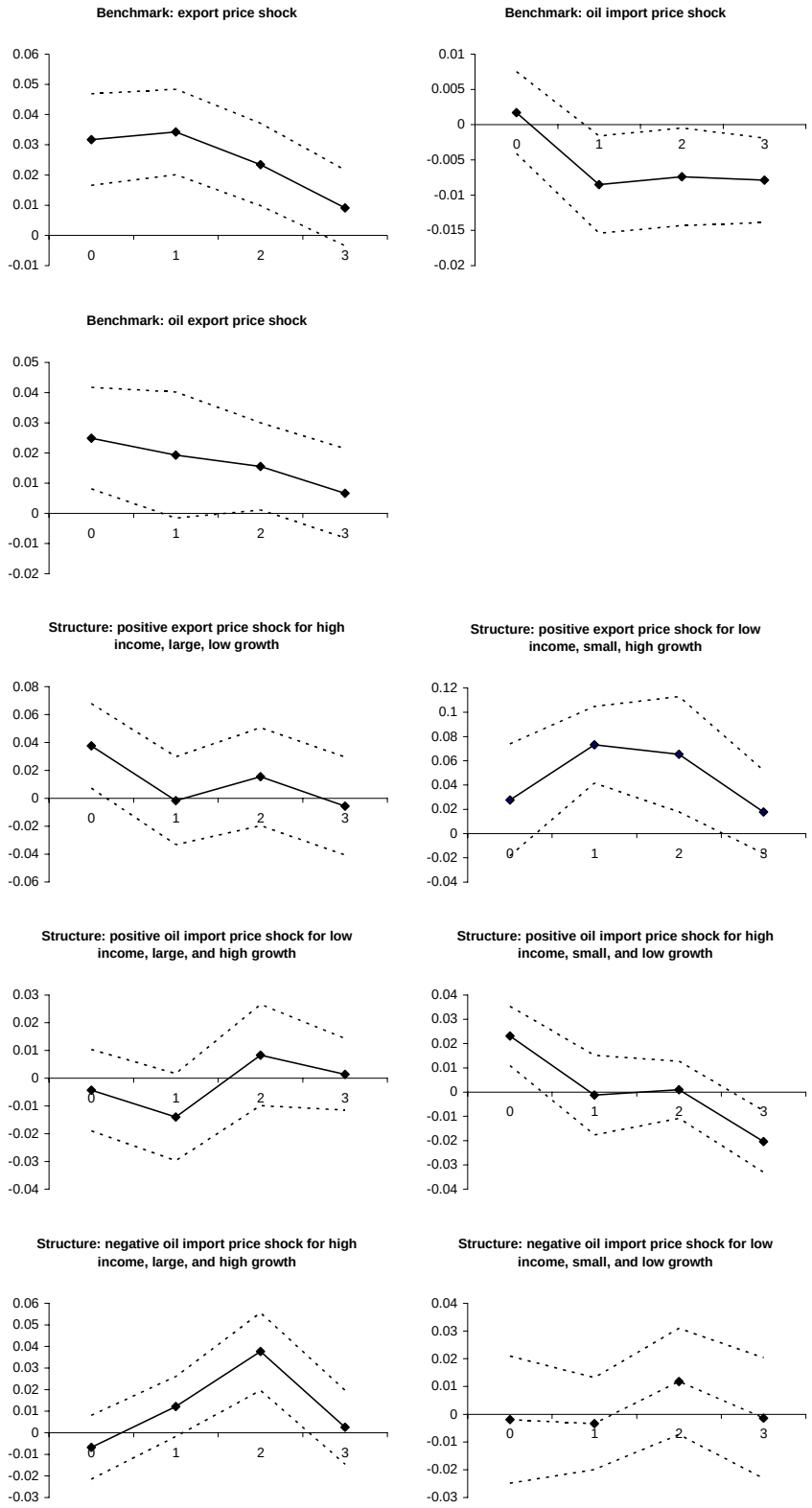
Note: The dependent variable is the first-differenced log of real GDP per capita in year t. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6b: Aid and Shocks

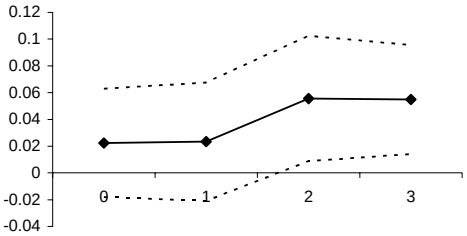
	Export price NEG	Oil import price POS	Coup	War	Geo Shocks	Clim Shocks	Hum Shocks
Aid	-0.003	-0.002	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)***	(0.008)***	(0.010)***	(0.006)***	(0.012)***	(0.013)**	(0.006)***
Shock	-0.572	-0.599	-0.003	-0.118	0.206	-0.002	-0.026
	(0.221)	(0.089)*	(0.764)	(0.162)	(0.143)	(0.745)	(0.184)
L.	-1.487	0.518				0.001	
	(0.255)	(0.663)				(0.800)	
L2.	0.018	-1.135				0.004	
	(0.990)	(0.252)				(0.396)	
L3.	-1.367	-0.554				-0.001	
	(0.375)	(0.638)				(0.850)	
Aid * Shock	0.011	0.008	-0.001	0.001	-0.000	-0.001	0.001
	(0.025)**	(0.025)**	(0.045)	(0.124)	(0.993)	(0.053)*	(0.296)
L.	0.022	-0.004				0.001	
	(0.172)	(0.755)				(0.031)**	
L2.	0.005	0.017				-0.000	
	(0.765)	(0.106)				(0.387)	
L3.	0.020	0.005				0.000	
	(0.238)	(0.644)				(0.397)	

Note: The dependent variable is the first-differenced log of real GDP per capita in year t. Aid is instrumented. We only report variables of interest and omit core variables such as income and size as well as the country-specific fixed effects. P-values are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

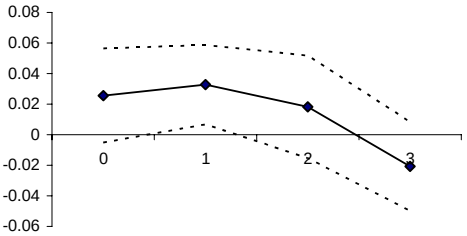
Figure 1: Impulse Responses:



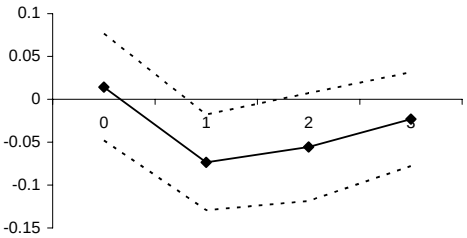
Structural policies: positive export price shock for fixed exchange rate, high depth, low rigidity, low openness



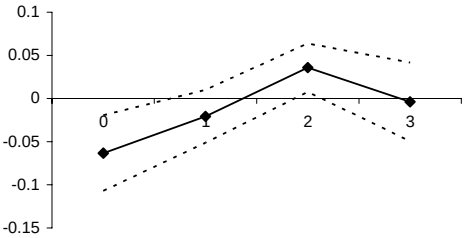
Structural policies: positive export price shock for floating exchange rate, low depth, high rigidity, high openness



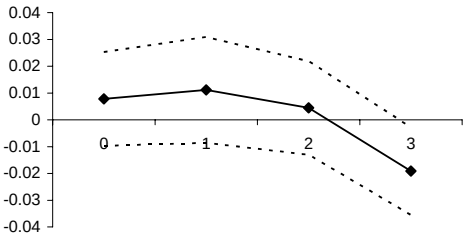
Structural policies: negative export price shock for fixed exchange rate, low depth, high rigidity, median openness



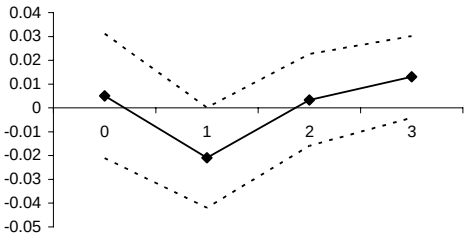
Structural policies: negative export price shock for floating exchange rate, high depth, low rigidity, median openness



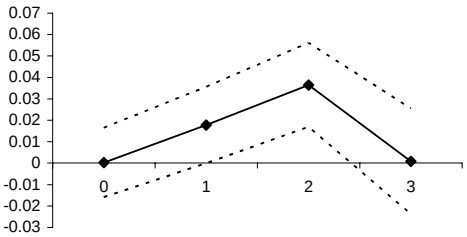
Structural policies: positive oil import price shock for floating exchange rate, high depth, mean rigidity and high openness



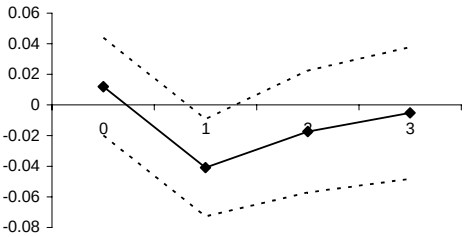
Structural policies: positive oil import price shock for fixed exchange rate, low depth, mean rigidity, low openness



Structural policies: negative oil import price shock for floating exchange rate, mean depth, low rigidity, mean openness



Structural policies: negative oil import price shock for fixed exchange rate, mean depth, high rigidity, mean openness



Data Appendix

Aid
Aid as a percentage of GNI was obtained from http://www.oecd.org.

Checks
Number of checks on the executive and legislature. Source: Database of Political Institutions (DPI).

Civil War/Risk of Civil War
Estimates are based on Collier and Hoeffler (2004), data are available from http://users.ox.ac.uk/~ball0144

Coup d'Etat/Risk of Coup d'Etat
Estimates are based on Collier and Hoeffler (2006), data are available from http://users.ox.ac.uk/~ball0144

Debt
Total external debt to gross national product. Source: WDI September 2005.

Deficit
Cash surplus or deficit is revenue (including grants) minus expense, minus net acquisition of nonfinancial assets. Source: WDI September 2005.

Elections
The number of elections held for the lower house of a national legislature in a given year. Source: Banks' Cross-National Time-Series Data Archive.

GDP per capita PPP
GDP per capita, PPP-adjusted in constant US$ (base year 1996), source Penn World Table 6.1.

GDP per capita
World Development Indicators September 2005.

Parliamentary System
Dummy variable which takes the value of one if the parliament appoints the chief executive. Source: variable 'System' from Database of Political Institutions (DPI).

Primary Commodity Export Price Index
Authors' own calculation, following Deaton and Miller (1995) and Dehn (2000).

Remittances
Workers' remittances and compensation of employees comprise current transfers by migrant workers and wages and salaries earned by nonresident workers. In addition,

migrants' transfers, a part of capital transfers, are treated as workers' remittances in. Source: Global Development Finance April 2005.

Reserves
International reserves are the sum of a country's monetary authorities holdings of special drawing rights, its reserve position in the IMF, its holdings of foreign exchange, and its holdings of gold (valued at year-end London prices). Source: Global Development Finance April 2005.

Export price index and oil price index
Commodity prices are from the IMF's International Financial Statistics. Data on commodity exports and imports are from UNCTAD commodity yearbook and United Nations International Trade Statistics.

Natural disaster data
Data on natural disasters are from WHO Collaborating Centre for Research on the Epidemiology of Disasters (CRED), www.em-dat.net