State fragility, macroeconomic policies and macroeconomic outcomes in sub-Saharan Africa *

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Abstract

We study how state fragility conditions affect macroeconomic outcomes in sub-Saharan African economies, and identify some of the most plausible transmission mechanisms. Applying dynamic panel estimation techniques and structural vector autoregressions to data on 48 sub-Saharan African economies over the period 1995 to 2014, we show that countries with greater fragility suffer higher macroeconomic volatility and crisis; they also experience weaker growth. When we jointly control for state fragility along with selected macroeconomic policy variables, we find that the latter seizes to play a significant role—providing circumstantial evidence of the "seesaw effect". Hence, we conclude that it is state fragility conditions, and not necessarily macroeconomic policies, that are of first-order importance in explaining macroeconomic performance in Africa. Moreover, the knock-on effects are mostly mediated through the fiscal channel, the aid channel, and the finance channel. Consequently, interventions to fragile states should best be organized in such a way that they focus on exploiting the potential for using fiscal policy, aid, and finance as instruments to improve macroeconomic outcomes in sub-Saharan Africa.

Keywords: State fragility, macroeconomic volatility and crisis, dynamic panel model, macroeconomic policies, sub-Saharan Africa
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1 Introduction

Despite significant progress made in the last two decades, sub-Saharan African economies have lagged behind other regions on almost any standard measure of macroeconomic performance. At the same time, sub-Saharan African countries dominate the top 50 percentile of rankings on almost all dimensions and indicators of state fragility. Could it be that Africa's predominantly fragile situation is primarily responsible for its broad poor macroeconomic performance? Such a proposition would be contentious, especially in the light of the Washington consensus (i.e., views mostly held by the IMF and the World Bank), which agrees that macroeconomic outcomes in developing economies are mainly determined by macroeconomic policies (see for examples Williamson, 2000; Stiglitz, 2005). Although the empirical connection between macroeconomic policies and macroeconomic performance and outcomes are somewhat established (see for example Easterly, 2005), there remain ambiguities about the underlying drivers of this relationship. Two questions emerge: Are poor macroeconomic outcomes the result of not only, or not even primarily, economic factors but those of deep underlying state fragility problems? What are the mechanism and channels by which state fragility affects macroeconomic outcomes?

In endeavouring to answer these questions, it is instructive to first lay a foundation for thinking about such a multidisciplinary and multifaceted concept as state fragility, especially in the context of the present study. Fragility refers to situations where the "social contract" is broken due to the state's incapacity or unwillingness to deal with its basic functions and obligations regarding the rule of law, poverty reduction, protection of human rights and freedoms, security and safety of its population, service delivery, equitable distribution of resources and opportunities, among others (see European Report, 2009). The reference in this definition to the "social contract", which is an outcome of continuously updated bargaining between the state and the society, broadens the relevance of the definition and enables us to consider its pervasive effects and consequences on the economy. Despite the definitional differences in the literature, Stewart and Brown (2009), after a meta-analysis, find that all existing definitions are built around three main themes: authority, service delivery, and legitimacy; and this categorization forms the basis for how we think about the concept of fragility in the rest of the discussion.

This paper seeks to understand how state fragility conditions affect macroeconomic outcomes in sub-Saharan African economies; particularly in terms of volatility, crisis, and growth, and to identify the most plausible mechanisms of transmission from state fragility to macroeconomic outcomes. An understanding of this relationship is important in many respects. For one, although mainstream economic thinking posits that macroeconomic outcomes are a result of the path of factor accumulation (Solow, 1956), human and physical capital development (Romer, 1986), technical progress and innovation (Aghion & Howitt, 1992; Romer, 1990), and more recently, economic policy and institutions (Easterly, 2005;

Acemoglu, Johnson, & Robinson, 2005), these factors still do not completely explain the differences in economic performance around the world; as instances abound of countries that have satisfied the theoretical conditions for favourable macroeconomic outcomes and yet have recorded disappointing results. This suggests that there could be other deep underlying factors that may matter, perhaps even more, for understanding economic performance, particularly for a region with dynamic and evolving political systems.

Secondly, given that the channels of transmission from state fragility situations to the macroeconomy could be multifaceted and interconnected, it is important to identify the most significant channels of transmission in other to properly manage and concentrate domestic and international interventions to fragile states around those mediating channels. Further, from an empirical point of view, the task of understanding the relationship between state fragility and macroeconomic performance is complicated by the potential endogenous causation that may exist between state fragility and macroeconomic outcomes, and also the spill-over or "bad neighbours effect" described in Chauvet and Collier (2005). In spite of this complication, because the region has a pervasive and dynamic history of state fragility conditions, it offers an excellent opportunity, in terms of wider N cross sections and longer T time periods, to undertake a thorough examination of the consequences of state fragility on macroeconomic outcomes in Africa.

We use insights from stylized facts and carefully specified regression estimation equations to analyse these relationships. In particularly, cross-sectional regressions, internal instrumentation based dynamic panel system generalized method of moments (SGMM), and structural vector autoregressions (SVAR) are applied to data on 48 sub-Saharan African economies over the period 1995 to 2014. Data collected from the Centre for Systemic Peace (see Marshall & Cole, 2014) on state fragility indicators and different dimension clusters of state fragility are used in the analysis, while data on macroeconomic indicators are retrieved from the World Development Indicators (WDI). The main result of the paper show that both state fragility and macroeconomic policies play independent and interdependent, but non-trivial, roles in the determination of macroeconomic outcomes in Africa.

Overall, we find that countries that are more fragile suffer higher macroeconomic volatility (measured by the relative standard deviation of growth rate), and more severe crisis (measured by the worst drop in output). There is also evidence that they experience lower macroeconomic performance (measured in terms of GDP growth)—although this aspect does not survive well in different models. Further, when we jointly control for state fragility positions along with selected macroeconomic policy variables, often regarded as key determinants of macroeconomic outcomes, we find that macroeconomic policy variables seize to play a significant role, whereas fragility continues to be significant. This implies that macroeconomic policies are not the primary determinants of macroeconomic outcomes in Africa, but could be a reflection of the underlying fragility conditions, little wonder most conventional macroeconomic policy prescriptions have hardly achieved desired results in the

continent (see Easterly & Levine, 1997, for evidence). A logical interpretation would be the so-called "seesaw effect" (see Acemoglu, Johnson, Robinson, & Thaicharoen, 2003); this is a mechanism whereby severe state fragility conditions make it possible for the ruling class to keep changing and switching macroeconomic policy instruments in ways that allow then to self-appropriate rents whenever they are prevented from using a hitherto exploitative instrument.

In search of plausible mechanisms of transmission, we find that state fragility exerts knock-on effects on macroeconomic volatility through the fiscal policy channel (measured by the size of government expenditure), the aid channel, and the finance channel. In particular, fragile states with more developed financial sectors have a greater propensity to experience macroeconomic problems (i.e. volatility) as the state becomes more fragile. Contrarily, aid flows help to dampen macroeconomic volatility so that fragile states with greater aid flows are more likely to experience lower macroeconomic volatility. We, however, do not find evidence to support the role of the investment channel and global shocks channel. The baseline results generally survive well under different sensitivity and robustness checks. In general, the findings indicate that it is state fragility conditions, and not necessarily macroeconomic factors, that are of first-order importance in explaining macroeconomic outcomes in Africa. One key implication for policy is that any domestic and international interventions to fragile states, that would be effective and pragmatic, should essentially be organised in such a way that they focus on exploiting the potential for using fiscal policy, aid, and finance as instruments to improve macroeconomic outcomes and performance in sub-Saharan Africa.

Our paper is related, in a broad sense, to three different strands of literature: the large literature on the determinants of economic growth (see Barro, 1991; Sachs & Warner, 1997; Sala-i Martin, 1994); the literature on causes of macroeconomic volatility and crisis in industrialized and developing economies, especially those concentrating on economic factors (see Easterly, Islam, & Stiglitz, 2001; Beck, Lundberg, & Majnoni, 2001; Loayza, Ranciere, Servén, & Ventura, 2007); and more closely, the literature investigating the relationship between institutional conditions and economic performance (see Acemoglu et al., 2005, 2003; Benhabib & Rustichini, 1996; Klomp & de Haan, 2009). Our study is an improvement and extension to some of these studies in a few dimensions. First, by considering state fragility positions and not simply the quality of institutions, we are able to capture, in a precise and more encompassing manner, the deep and underlying political, economic, ethnic, and colonial foundations of a society, and show how they affect contemporary macroeconomic outcomes.

Secondly, most papers measure macroeconomic volatility as the standard deviation of GDP growth, this is somewhat problematic as it does not take account of the differences in growth performance across countries. Moreover, the standard deviation measure is sensitive to the choice of the rolling time window (Aizenman & Pinto, 2005). Our solution

strategy is to use the relative standard deviation, defined as the standard deviation divided by the absolute mean growth rate, mainly because it overcomes the highlighted limitations above (see Klomp & de Haan, 2009, for more on this). Finally, our methodology goes a step further by employing the workhorse for macroeconomic policy analysis, i.e., structural vector autoregressions, which allows us to conduct "what-if" experiments that help to better understand how current situations would dynamically evolve if there is a sudden change in circumstances.

The balance of the paper is organized as follows. In the next section, we document stylized facts and unconditional relationships between state fragility and selected measures of macroeconomic outcomes and macroeconomic policies in sub-Saharan Africa. In Section 3, we examine some conceptual issues, in particular, we examine five different possible channels and mechanisms of transmission from state fragility to macroeconomic outcomes. In Section 4, we present the empirical strategy and explain the measurement and estimation techniques adopted. In Section 5, we present the results and discuss their implications in the light of the specified models and variables. Robustness and sensitivity analysis that help to validate the initial conclusions are presented. In Section 6, we conclude and highlight some important points for policy intervention.

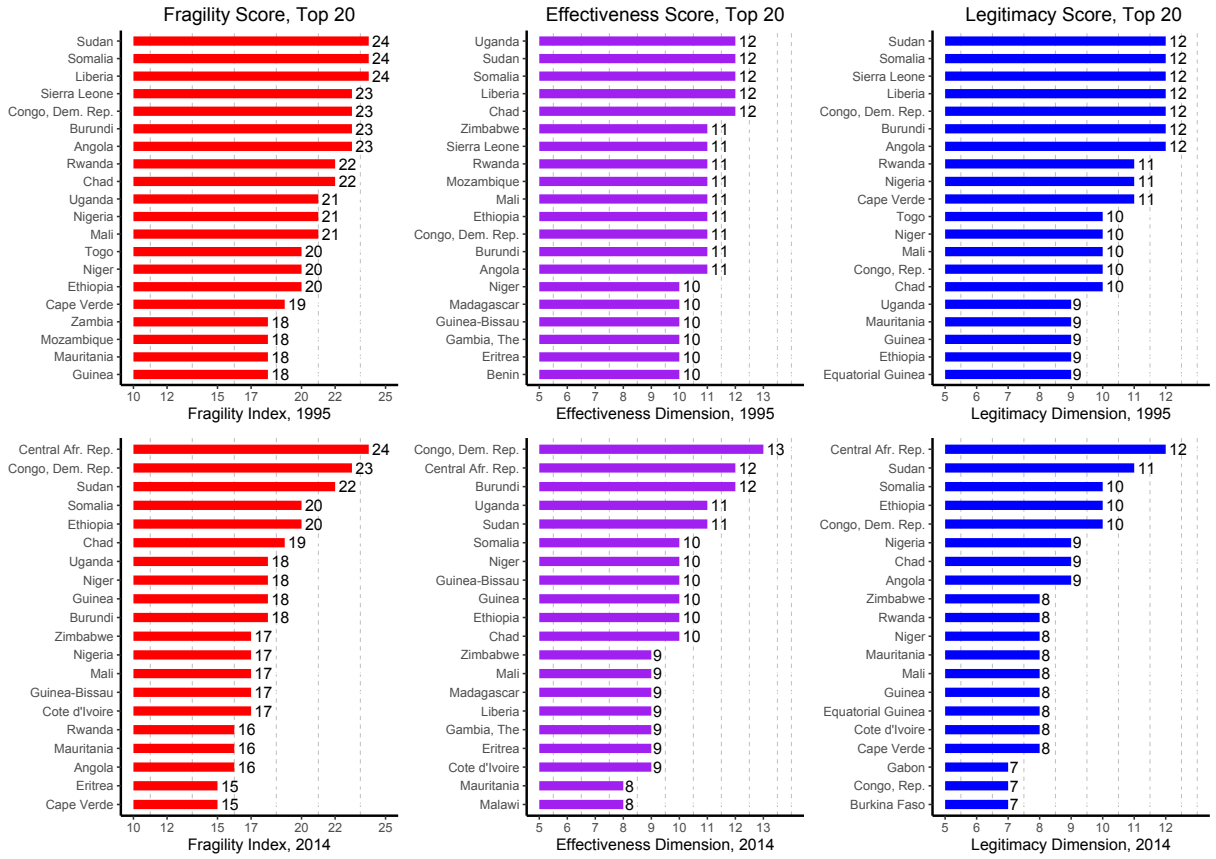
2 Stylized facts and unconditional relationships

We examine the unconditional relationships and characteristics of state fragility, especially as it relates with macroeconomic outcomes and policies in sub-Saharan Africa, using the dimension clusters of the State Fragility Index and Matrix 2014, prepared by the Centre for Systemic Peace (see Marshall & Cole, 2014).[1] Generally, two of the main characteristics of state fragility are its persistence and the low probability of graduation out of fragility (see Chauvet & Collier, 2008). According to a recent ranking by the World Bank, 35 countries that were regarded as being fragile in 1979 were still reported to be fragile 30 years later, as at 2009 (European Report, 2009). This observation is in line with the low estimate of 1.85 percent by Chauvet and Collier (2008) for the probability of sustained graduation out of the group of fragile states.

To better understand the contemporary sub-Saharan African experience, we plot a snapshot of the top 20 ranked countries in sub-Saharan Africa by aggregate fragility, effectiveness, and legitimacy for 1995 and 2014 in Figure 1. Looking at the two panels in

[1]The State Fragility Index and Matrix 2014, a publication by Centre for Systemic Peace, is a ranking of 167 independent countries with a population of more than 500,000. The Fragility Index assigns scores to each country based on effectiveness and legitimacy using performance in four additional dimensions: security, political, economic, and social. Each dimension is rated on a four-point scale as follows: 0 "no fragility", 1 "low fragility", 2 "medium fragility", and 3 "high fragility". In addition, the economic effectiveness dimension is rated on an additional fourth scale: 4 "extreme fragility". The scores from the six dimensions are then combined to get the aggregate Fragility Index, which ranges from 0 "no fragility" to 25 "extreme fragility".

Figure 1: Characteristics of state fragility by dimension clusters, top 20 countries



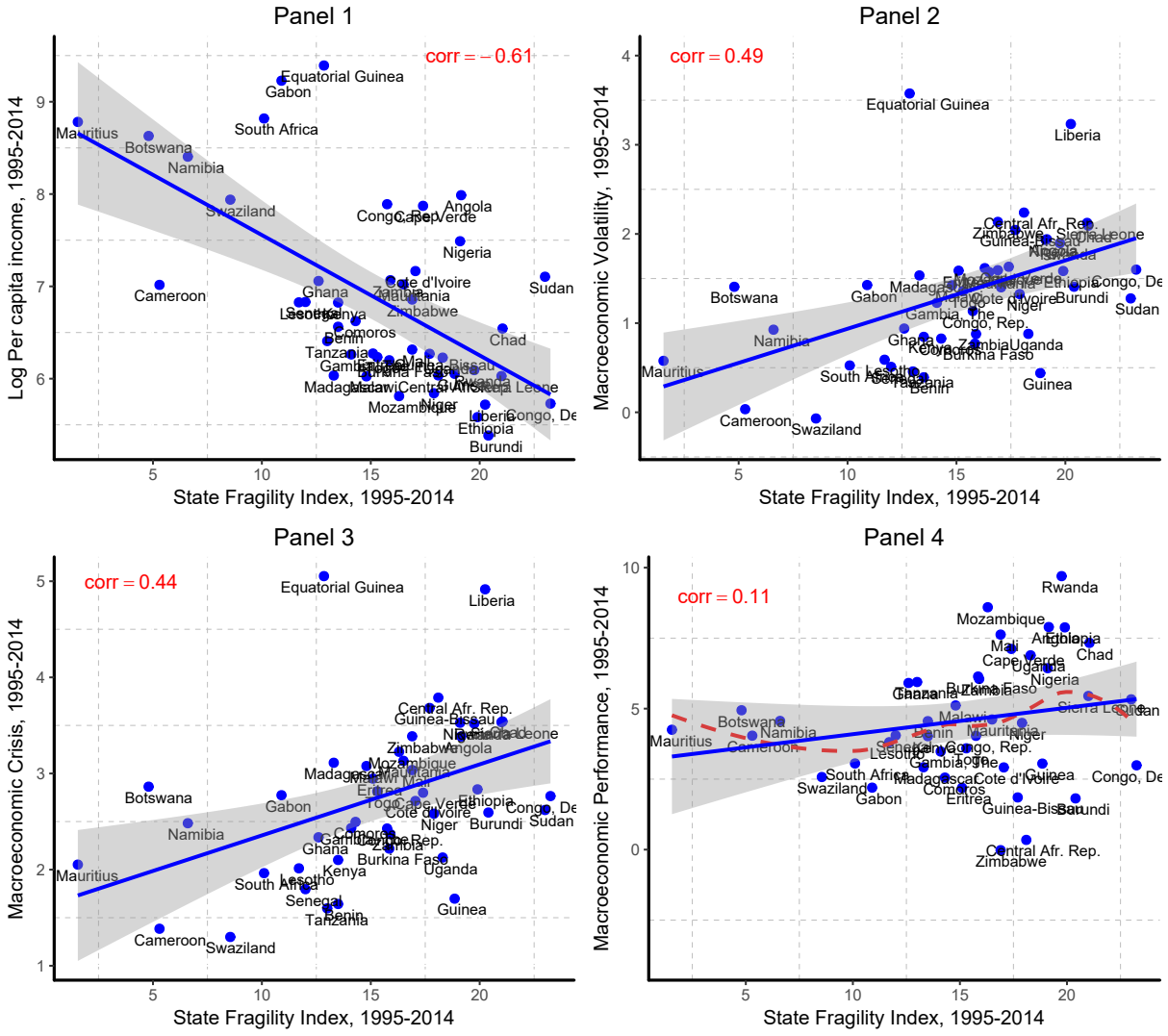
Note: Charts are based on data from the State Fragility Index and Matrix 2014, a publication by Centre for Systemic Peace

the first column of Figure 1, what we observe is that 15 out of the top 20-ranked fragile countries in 1995 still maintained their membership in the top 20 ranking in 2014, 19 years later. Although there are a few significant movements in the position of some countries, for example, Angola; only five countries: Liberia, Sierra Leone, Togo, Mozambique, and Zambia managed to exit the top 20 ranking. While five new countries entered the top 20 pool, including Central African Republic, Zimbabwe, Guinea-Bissau, Ivory Coast and Eritrea. These movements, although modest, show some level of dynamism in the fragility situation of African countries. When the other dimensions, i.e., effectiveness and legitimacy, are considered a very similar pattern is observed. In general, the data shows that, in absolute terms, the overall fragility situation of many African countries has reduced over the past two decades. However, in relative terms, there are hardly any changes, as the most fragile countries in 1995 were still typically the most fragile in 2014, thereby raising further questions about the effectiveness of national and international peacekeeping and state-building interventions.[2]

What is the correlation between state fragility conditions and macroeconomic outcomes,

[2]See Collier, Hoeffler, and Söderbom (2008) for a discussion on the role of peacekeeping missions in containing post-conflict risks.

Figure 2: State fragility and macroeconomic volatility, crisis, and performance

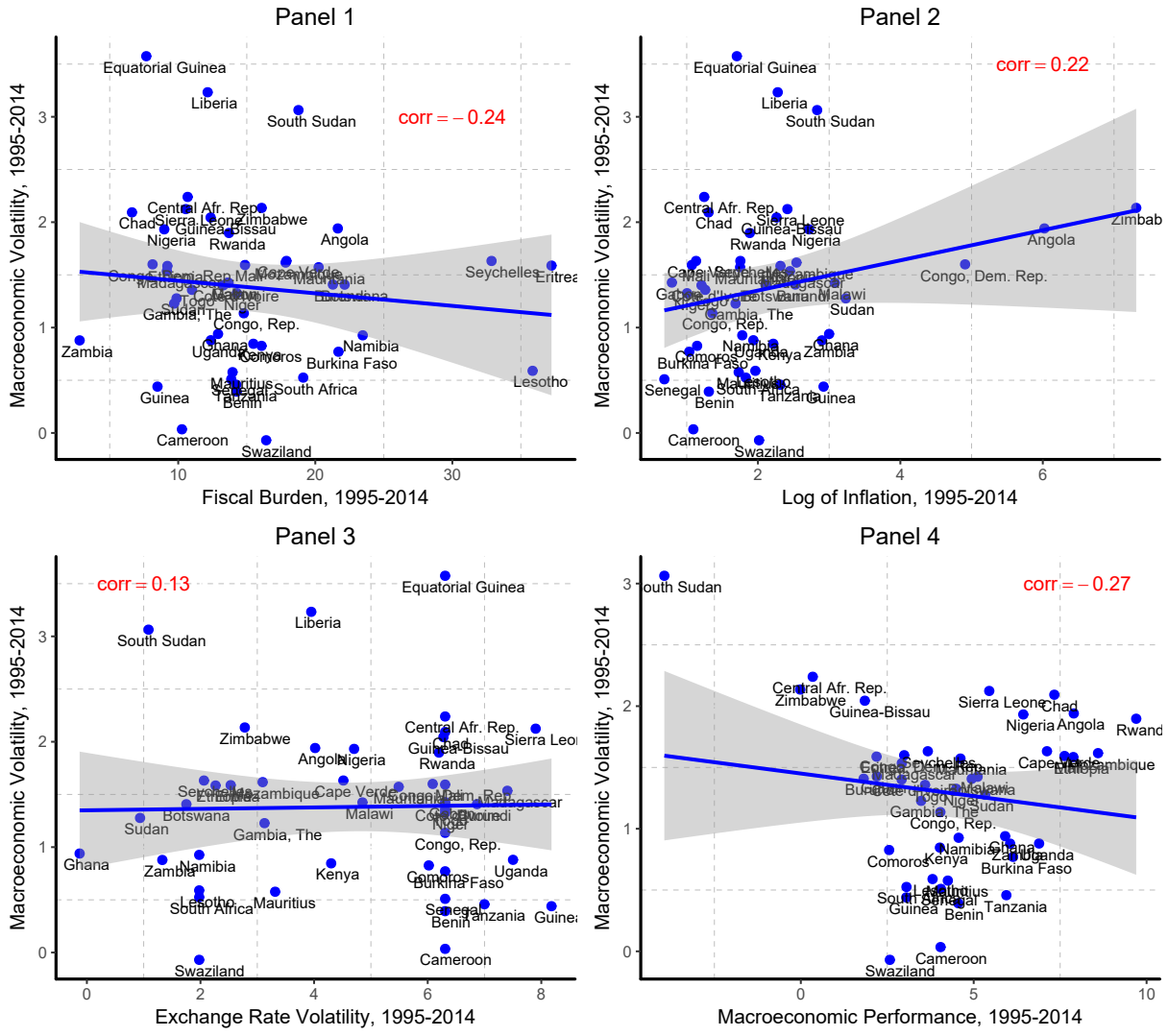


especially in terms of volatility, crisis, income levels, and per capita growth? We examine this question by plotting bivariate scatter plots of state fragility conditions and macroeconomic outcomes for 41 sub-Saharan African countries over the period 1995 - 2014. In Panel 1 of Figure 2, we observe that state fragility is strongly negatively correlated with low-income levels, with a correlation coefficient of -0.61. In Panel 2, the relationship between state fragility and macroeconomic volatility, measured as the relative standard deviation of per capita growth, is strongly positive. This is also the case for macroeconomic crisis, measured as the worst output drop in the period, with a correlation coefficient of 0.44, plotted in Panel 3 of Figure 2. The directions of these correlations are as expected from theory, but how should we interpret them? At this point, we refrain from suggesting any structural interpretations. What is, however, counter-intuitive is the direction of the correlation between state fragility and macroeconomic performance, measured in terms of GDP growth. In Panel 4 of Figure 2, the slightly positive correlation suggests that fragile countries grow relatively faster than others, but this relationship is far from being robust because when

we fit a non-linear regression line to the scatter, shown as the red and dashed line, we observe segments with both positive and negative correlation, suggesting the existence of a non-linear relationship between state fragility and output growth. These patterns are examined further in the methodology section.

Mainstream macroeconomists maintain that macroeconomic outcomes are a result of macroeconomic policies and not necessarily nation-state fundamentals. Is there any reason to suspect that state fragility, more than macroeconomic policies, drive macroeconomic outcomes in African countries? We examine these thoughts by plotting the bivariate relationship between three main macroeconomic policy variables in Figure 3: fiscal burden (measured by government expenditure in GDP), monetary policy effectiveness (measured by the CPI inflation), exchange rate stability (measured as changes in the real exchange rate), and macroeconomic volatility all measured over the period 1995-2014.

Figure 3: Macroeconomic policies and macroeconomic volatility



In Panel 1 of Figure 3, we observe a strong and negative relationship between macroeconomic outcome, measured in terms of GDP volatility, and fiscal burden. This observed

relationship for our African sample is particularly insightful, as it does not conform to the relationship commonly observed in worldwide samples, where countries with large government sectors have been shown to experience higher levels of volatility and crisis. This relationship is partly understandable in the context of our sample, especially because in sub-Saharan Africa, the government is the biggest driver of most economies with minimal influence by the private sector. Panel 2 of Figure 3, shows that there is a positive correlation between inflation and macroeconomic volatility, as expected, and in Panel 4, we find that more volatile economies have slower growth rates, the correlation is about -0.27. The relationship between exchange rate volatility and macroeconomic volatility is not very clear from the scatter plot in Panel 3 of Figure 3. This could be partly explained by the dual nature of the role that exchange rate plays; i.e., it could be a stabilizer or a magnifier of shocks, depending on the degree of free-market determination. In subsequent sections of the paper, we endeavour to investigate whether these correlations reflect the causal effect of bad macroeconomic policies on outcomes, or whether they are capturing the knock-on effects of state fragility conditions.

3 Conceptual issues

3.1 State fragility and macroeconomic outcomes: some ideas

Why should state fragility be important for economic outcomes? There is fairly strong evidence of the correlation between state fragility and poor macroeconomic outcomes in Africa, see Figure 2 and European Report (2009). What is, however, lacking is a comprehensive literature on the role that state fragility plays in shaping the economic situation of nations through its impacts and costs on economic, social, and security indicators. There are good reasons to expect that states with higher levels of fragility would experience higher aggregate volatility and worse macroeconomic performance. In fragile states, for example, because of the limited constraints on the political elite, they often tend to use state powers to redistribute assets and incomes to themselves and to their cronies, in the process creating economic distortions and turbulence. This tendency is likely to be highly minimized in a more stable state with effective institutional constraints on the ruling elite, thereby eliminating this source of economic uncertainty.[3]

Secondly, because there are greater stakes, in terms of gains and losses from controlling political power in fragile states, they tend to have greater infighting for power among various groups. This increased political competition often leads to greater macroeconomic volatility and lower performance, see Collier, Elliott, Hoeffler, Reynal-Querol, and Sambanis (2003), Besley and Persson (2010), and Besley and Persson (2011). While state fragility may lead to adverse macroeconomic outcomes, the structure and stage of development of

[3]These ideas have been formalized by Acemoglu et al. (2005), using simple dynamic models.

an economy are often important factors affecting the stability and resilience of the states, and the likelihood of transition into failed or severe conflict situations, a process carefully documented in Collier (2007). The idea that economic growth is a solvent for state fragility have been debunked severally, as there are many examples of countries with high growth rates and yet severe state fragility conditions; see for examples Naudé, Santos-Paulino, and McGillivray (2011), Collier et al. (2003), and Collier (2007). The point is that other domestic and external factors could have more significant stabilizing and/or destabilizing effects on the performance of an economy.

The potential channels by which state fragility could have macroeconomic consequences are multifaceted and widespread. Some of the channels could be broadly identified and quantified; e.g., aid, finance, investments, global shocks, employment, human capital development, etc. Others are indirect; e.g., changes in intertemporal decisions of economic agents, alterations in the composition of government expenditure and revenue, changes in the demographic distribution of the population. While some channels are difficult to pin-down, e.g., the bad neighbour effect, emotional and psychological effects, it is possible to quantify the mechanism and role of more obvious macroeconomic channels. In the next section, we provide a brief discussion of what we consider to me the more tractable channels.

3.2 Some transmission mechanisms

3.2.1 The aid channel

Fragile states generally attract more aid and development assistance than other developing economies (see OECD, 2013), and this aid could either be channelled to fill the finance gap, the investment gap, or the non-conventional and more contemporary role of Peacebuilding and Statebuilding goals (PSGs). Here, we concentrate on the PSG role of aid. There is generally the possibility of a two-way link for the role of aid in fragile states. Recent research by Jones and Tarp (2016) revalidates the notion that aid helps improve political institutions, a key dimension of state fragility. This does not, however, displace the notion that the effectiveness of aid depends on the initial conditions of the quality of institutions (see Easterly, Levine, & Roodman, 2003). The idea is that aid, through its Peacebuilding and Statebuilding roles, could potentially help reduce state fragility conditions, and hence positively affect macroeconomic performance and minimize volatility. However, in severely fragile states, with low credibility of institutions, aid could enhance the likelihood of conflict and mismanagement, thereby increasing macroeconomic volatility.

3.2.2 The investment channel (physical and human)

The links between state fragility and macroeconomic outcomes could be mediated through the investment channel; both physical and human capital investments, and domestic

and foreign investments. Apart from the fact that state fragility reduces the volume of investments, especially FDI, it also affects the composition of investments by tilting incentives towards the accumulation of less specialized capital goods, often having lower returns, which can be easily divested in response to fragility shocks (see Wolf, 2005). The associated ease with which these investments could be divested or reallocated constitutes, in its self, a source of macroeconomic volatility. On the human capital side, state fragility induces reductions in the quality and quantity of investments in health and education (see European Report, 2009, p. 41-42), it also alters the composition of skilled versus unskilled labour, as households would rather spend short periods learning different vocations that would allow them to cross between sectors in response to fragility shocks, than spend several years studying a profession.

3.2.3 The finance channel

The role of the finance channel—the level of development of the financial sector—in conveying the effects of state fragility situations to macroeconomic outcomes is ambiguous and could be described as nisi. On the one hand, it could act as a shock absorber, helping to stabilize the macroeconomy from fragility shocks, whereas, on the other hand, it could be a source of shock amplification, and thus magnify the effects of state fragility shocks on the macroeconomy. Empirical evidence, for examples, in Beck et al. (2001), and Easterly et al. (2001), show that the relationship is nonlinear. That is, the financial system acts as a stabilizer and reduces volatility in high-income economies, but may increase volatility in low- and middle-income countries, and this may well depend on the degree of international financial integration.

3.2.4 Global shocks and the trade channel

The nature of the effect of state fragility on economic performance through the transmission of global shocks and trade openness to the rest of the economy is not obvious. While state fragility may influence the nature of the relationship between openness and macroeconomic outcomes, international trade can also produce an impact on economic dimensions of state fragility by altering the structure of relative prices of internationally traded goods and services. On the one hand, global shocks and trade openness could be detrimental in the sense that they help to weaken the dependency links between elite groups and other social groups, thereby providing incentives for the political elite to favour rent-seeking policies as against investing in public goods which could magnify macroeconomic volatility. Indeed, Lujala, Gleditsch, and Gilmore (2005); Chauvet, Collier, and Hoeffler (2010); and Lujala (2010) among others are of the view that local income generation through "trade" in natural resources motivates civil wars by serving as a means of financial rebellion. On the other hand, the beneficial effect of trade openness and global shocks is that they allow

for insulation against domestic fragility shocks, and also enhances the role of the real exchange rate to serve as an instrument for macroeconomic stabilization. Focusing on sub-Saharan Africa, Bussmann, Schneider, and Wiesehomeier (2005) provide evidence that trade openness and liberalization minimizes the possibility of an outbreak of internal war, and enhances peace and stability in the long run.

3.2.5 The "bad neighbours" channel

Empirical evidence shows that an estimated 80 percent of the cost of fragility is borne by neighbouring countries, with the bad-neighbours effect estimated at about 0.6 percent of lost output growth per neighbour see Chauvet, Collier, and Hoeffler (2011), and European Report (2009). There are several channels by which fragile states exert an influence on their neighbours macroeconomic outcomes. Although of itself, fragility does not appear to be contagious, it does lead to the diffusion of political instability to neighbouring states. A typical example is the Liberian experience, where president Charles Taylor provided mercenaries, money, weapons and infrastructure to rebel groups in Sierra Leone with the objective of gaining control over regional diamond mines and economic networks (see Iqbal & Starr, 2008). Further, there are also macroeconomic implications of the movement of refugees to neighbouring countries as a result of fragility. In addition to its potential for being an incubation ground for violent groups and crime, refugee movements create pressure on health and education infrastructure through the spread of diseases, e.g., malaria and AIDS, and the overpopulation of schools. For example, there is evidence that the refugee movements from Burundi and Rwanda to Tanzania has exacted heavy consequences on the health and school participation in the Kagera region. These effects are very likely to be passed on to the macroeconomic performance of the country.

4 Empirical strategy

4.1 Measuring macroeconomic consequences

In mainstream economics, the macroeconomic consequences of whatever phenomenon (e.g., state fragility, natural disasters, climate change, terrorism etc.) are often thought of, in terms of how they affect economic growth, price stability, employment, the balance of payments and the distribution of income. Recent theoretical and empirical observations, however, have shown that volatility and crisis are of "first-order" importance (see Aizenman & Pinto, 2005, p. 5-6), and are driven by the same fundamental factor loadings as mainstream performance indicators such as growth, employment, and price stability. Hence, in addition to using GDP per capita growth, we use measures of macroeconomic volatility as our baseline measure of the macroeconomic consequences of state fragility in sub-Saharan

Africa.[4]

The common practice in most applied research is to use the standard deviation of GDP per capita or its interquartile range over a rolling window as a measure of macroeconomic volatility, see for examples, Acemoglu et al. (2003), Easterly et al. (2001), and Mobarak (2005). However, we have decided against the use of these simple measures because of some practical concerns. For one, these measures are very sensitive to the choice of the sample length (or rolling window), and secondly, as Klomp and de Haan (2009) noted, they do not take into account the growth differences across countries, even when we know from Figure 2 that the negative impacts of volatility are likely to be more pronounced in lower-income countries than in higher-income economies.[5] We rather use the relative standard deviation of GDP per capita growth as our measure of volatility (see also Klomp & de Haan, 2009). Its main advantage is that, in addition to overcoming the highlighted limitations of the standard measures, it also accounts for the observation by Aizenman and Pinto (2005) and Mobarak (2005) that average GDP growth and its volatility are two moments of the same underlying factor: the income process. Therefore they are jointly determined and thus, should be analysed in conjunction with each other. The volatility indicator is thus given as;

$$\text{Macroeconomic volatility} \equiv \quad \sigma_{y,t} = \frac{1}{|\bar{y}_{i,T}|}\sqrt{\frac{\sum (y_{i,t} - \bar{y}_{i,T})^2}{n-1}}, \tag{1}$$

where $y_{i,t}$ is the growth rate of per capita GDP in country i at time t, $\bar{y}_{i,T}$ is the average growth rate over a predetermined period of time T, and n is the number of observation over the interval T.[6]

Although the relative standard deviation measure corrects for most of the weaknesses of using simple standard deviations as a measure of volatility, it is, however, not able to discriminate between what may be regarded as "normal" versus "crisis" volatility scenarios. This distinction, which is largely a question of the size of output oscillations, is important because it helps to avoid the problems of creating too many outliers when normal and extreme cases are lumped together as a measure of volatility. We follow the footsteps of

[4]Measures of volatility are increasingly becoming popular as a way to capture the macroeconomic consequences of diverse phenomena, some examples of recent applications include; Caldara, Fuentes-Albero, Gilchrist, and Zakrajšek (2016) on consequences of financial shocks, Klomp and de Haan (2009) on consequences of political institutions, and Acemoglu et al. (2003) on consequences of historical institutions.

[5]Other potentially important concerns that a practitioner would be interested in when using the standard deviation measure includes; the measurement frequency and aggregation level to use, whether to weight positive and negative values symmetrically or not, whether to use realized or expected volatility, whether to allow for thresholds, persistence, and bunching, among others, see Wolf (2005).

[6]Notice that this measure is very similar but not identical to the coefficient of variation. The main difference, however, is that to calculate the coefficient of variation, the standard deviation is divided by the mean growth rate, whereas, to calculate the relative standard deviation, the standard deviation is divided by the absolute mean growth rate, which ensures that the relative standard deviation is always a positive value.

Acemoglu et al. (2003) in measuring macroeconomic crisis; in particular, macroeconomic crisis is measured as the largest drop in output for every country for a specified interval (5 years for panel regressions and over 25 years for cross-sectional regressions). Thus,

$$\text{Crisis} \equiv \quad \sigma^{+}_{y,t} = \max_{\forall t \in T} \left| y_{i,t} - y_{i,T-j} \right|, \tag{2}$$

where $y_{i,t}$ is GDP per capita and T is the specified time interval to find the absolute value of the maximum drop in output.Finally, we also use average GDP growth rate and per Capita income as measures of economic performance.

Data on fragility is based on a slightly revised version of the state fragility index computed by the Centre for Systemic Peace. In particular, the economic components of the index are extracted: both economic effectiveness, measured by GDP per capita growth; and economic legitimacy, measured by the share of export trade in manufactured goods are deducted from the overall fragility index. For the economic indicators, we collect data from World Bank, World Development Indicators. The descriptive statistics, showing the means and standard deviations for these variables, as well as other variables used in the analysis are presented in Table Table 8 of the Appendix.

4.2 The baseline estimation equation

The baseline estimation equation seeks to identify the causal effect of state fragility conditions on macroeconomic outcomes, particularly in terms of macroeconomic volatility, crises, and performance. The general form of the estimation equation is given as;

$$\begin{gathered} \sigma_{y_{i,t-s,t}} = \alpha + \beta^{*}\text{Fragility}_{i,t-s,t} + \theta^{*}\boldsymbol{X}_{i,t-s,t} + \lambda^{*}Y_{i,t-s} + \epsilon_{i,t-s,t}; \\ \epsilon_{i,t-s,t} = \mu_i + \nu_{i,t}; \quad i = 1, \ldots, N; \quad t = 1, \ldots, T. \end{gathered} \tag{3}$$

Where $\sigma_{y_{i,t-s,t}}$ is the relevant measure of macroeconomic outcome for country i between times t and $t-s$ for all t. As earlier stated, the macroeconomic outcomes of interest are overall volatility (measured as relative standard deviation of per capita GDP), severity of crisis (measured as the worst drop in output), and overall performance (measured by GDP per capita growth). $\boldsymbol{X}_{i,t-s,t}$ is a set of control variables, which differs by equation, depending on the macroeconomic outcome of interest. The log of initial per capita income, $Y_{i,t-s}$, is included for two main reasons: first, to control for convergence effects following the growth regression convention in Barro and Sala-i-Martin (1992), and second, to account for the observation that poorer countries suffer more volatility relative to richer countries as depicted in Panel 4 of Figure 3. We assume that the error term, $\epsilon_{i,t-s,t} = \mu_i + \nu_{i,t}$, follows a one-way error component model, that is, $\mu_i \sim IID(0, \sigma^2_{\mu})$ are the individual fixed effects characterizing heterogeneity among individuals, and it is independent of the stochastic disturbance term $\nu_{i,t} \sim IID(0, \sigma^2_{\nu})$.

4.3 Internal instrumentation and causal effects: SGMM

The parameter of interest in Eq. (3) is β, the effect of state fragility on macroeconomic outcomes. Instinctively, one may consider estimating this equation using OLS type estimators. The problem, however, is that: (i) both state fragility and macroeconomic outcomes are endogenously determined, thus a simple OLS estimation of the relationship may simply be capturing reverse causality or the effect of an omitted variable on both state fragility and macroeconomic outcomes, (ii) there are likely to be non-linearities in the nature of the relationship, and (iii) which we consider to be more important, is the fact that the measurement of a multi-dimensional concept like state fragility, even in the most tedious circumstances, is done, at best, with modest levels of measurement error.[7] The highlighted concerns imply that any OLS based regression of Eq. (3) would not necessarily provide estimates that correspond to the causal relationship between state fragility and macroeconomic outcomes.

Therefore, to account for the problems of endogeneity, omitted variable bias, and measurement error, our approach is to take advantage of the internal instrumentation mechanism of the system generalized method of moments (SGMM) developed by Blundell and Bond (1998), which is specified as follows;

$$\begin{aligned} \sigma_{y_{i,t-s,t}} &= \alpha + \rho^*(\sigma_{y_{i,t-s,t}})_{t-1} + \beta^* \text{Fragility}_{i,t-s,t} + \theta^* \boldsymbol{X}_{i,t-s,t} + \lambda^* Y_{i,t-s} + \epsilon_{i,t-s,t}; \\ \epsilon_{i,t-s,t} &= \mu_i + \nu_{i,t}; \quad i = 1, \ldots, N; \quad t = 1, \ldots, T. \end{aligned} \tag{4}$$

With the moment conditions for the difference, and system equations of the GMM estimator given thus;

$$\begin{aligned} E[\sigma_{y_{i,t-s}}.\Delta\epsilon_{i,t}] = 0; \quad \forall s \geq 2, t = 3 \ldots T, \\ E[Z_{i,t-s}.\Delta\epsilon_{i,t}] = 0; \quad \forall s \geq 2, t = 3 \ldots T, \\ E[\Delta\sigma_{y_{i,t-s}}.(\mu_i + \epsilon_{i,t})] = 0; \quad \forall s \geq 1 \\ E[\Delta Z_{i,s}.(\mu_i + \epsilon_{i,t})] = 0; \quad \forall s \geq 1, \end{aligned} \tag{5}$$

where the only difference between Eq. (3) and Eq. (4) is the introduction of the dynamic term, $\rho^*(\sigma_{y_{i,t-s,t}})_{t-1}$, and the use of internal instruments, which are required to satisfy the moment conditions specified in Eq. (5) to estimate Eq. (4). $Z_{i,s}$ is the set of all predetermined and weakly exogenous variables in the system, including fragility.

To the extent that the moment conditions in Eq. (5) are not violated, a condition which could be tested with the Hansen-Sargan over-identifying restrictions test, the causal effect of state fragility on economic outcomes can be estimated consistently from our model of

[7] This is likely to be the case with most measures of state fragility, including the indices prepared by the Centre for Systemic Peace, which we use here; and more so because this measure uses a principal component to classify state fragility under three broad dimensions: security, legitimacy, and social effectiveness.

Eq. (4). However, one important caveat to note is that if the measurement error for both state fragility and the control variables are significant, their coefficients might be biased downwards due to the so-called attenuation bias. This risk is, however, downplayed by the use of 5-year averages of the variables, this procedure helps to average out any existing measurement error problems (also see Acemoglu et al., 2003).

4.4 Probing further: the channels of transmission

Mainstream macroeconomists, especially those affiliated to the Breton Woods Institutions, often consider macroeconomic outcomes and performance to be a primary function of the extent to which countries are able to adhere to the prescriptions of the so-called Washington Consensus (see for examples, Stiglitz (2005), Rodrik (2006), and Williamson (2000)). In other words, macroeconomic outcomes are determined by macroeconomic policies, mostly fiscal policy, monetary policy, trade policy, and financial policy. The empirical question we are interested in here is the nature of the relative effects of state fragility conditions and macroeconomic policies on macroeconomic outcomes. In particular, does state fragility have a first-order effect on macroeconomic outcomes or does it work through macroeconomic policies and (or) other associated channels?

To answer these questions, we start by estimating, in a mutually exclusive manner, the causal relationship between state fragility conditions and macroeconomic policies, on the one hand, and macroeconomic policies and macroeconomic outcomes, on the other hand, without controlling for other variable. Specifically, we run regressions of the form;

$$\mathcal{MP}_{i,t-s,t} = \alpha + \rho^*(\mathcal{MP}_{i,t-s,t})_{t-1} + \beta^* \text{Fragility}_{i,t-s,t} + \theta^* \boldsymbol{X}_{i,t-s,t} + \lambda^* Y_{i,t-s} + \epsilon_{i,t-s,t} \quad (6)$$

and

$$\sigma_{y_{i,t-s,t}} = \alpha + \rho^*_{\sigma}(\sigma_{y_{i,t-s,t}})_{t-1} + \gamma^* \mathcal{MP}_{i,t-s,t} + \theta^* \boldsymbol{X}_{i,t-s,t} + \lambda^* Y_{i,t-s} + \epsilon_{i,t-s,t}, \quad (7)$$

where $\mathcal{MP}_{i,t-s,t}$ is a measure of the macroeconomic policy of interest. Here, we focus on three measures of macroeconomic policy; (i) fiscal policy, measured in terms of fiscal burden, i.e., the share of government expenditure in GDP, (ii) monetary policy, measured in terms of domestic price stability, i.e., inflation, and (iii) monetary policy in terms of exchange rate stability and competitiveness.

Note that if the estimates for β and γ in Eq. (6) and Eq. (7), respectively, are both independently statistically significant, then it could mean that either state fragility affects macroeconomic outcomes through its effect on macroeconomic policies, or that both state fragility and macroeconomic policies have direct and independent effects on macroeconomic volatility. To uncover the precise nature of the relationship and also examine other theoretically plausible channels of transmission from state fragility to macroeconomic

performance, we consider four options, the finance, aid, investment and global shocks channel of transmission. We specify regression equations in which we jointly control for state fragility and macroeconomic policies and other potential channels of transmissions along with selected interaction terms. The idea is to consecutively drop each of the potential channels of transmission from the equation and observe its effect on the magnitude, sign, and significance of the state fragility coefficient, β.

The general form of the fundamental estimation equation is then given as;

$$\begin{aligned}\sigma_{y_{i,t-s,t}} = \alpha + \rho^*_\sigma(\sigma_{y_{i,t-s,t}})_{t-1} + \beta^*\text{Fragility}_{i,t-s,t} + \gamma^*\mathcal{MP}_{i,t-s,t} + \\ \zeta^*(\text{Fragility}_{i,t-s,t} \times \mathcal{MP}_{i,t-s,t}) + \theta^*\boldsymbol{X}_{i,t-s,t} + \lambda^* Y_{i,t-s} + \epsilon_{i,t-s,t},\end{aligned} \tag{8}$$

where all the variables are as previously defined. In a related application, Acemoglu et al. (2003) provide indicative recommendations about how to interpret the results from such a regression under three possible scenarios.

Scenario 1: If the effect of state fragility, β, is insignificant, and the effect of macroeconomic policy, γ, is significant, the most likely interpretation is that the effect of state fragility on macroeconomic outcomes and performance are mostly mediated through the channel of macroeconomic policies. As noted by Acemoglu et al. (2003), this interpretation does not rule out the possibility that macroeconomic policies could also have independent effects unrelated with that of state fragility. If Scenario 1 turns out to be the case, it would mean that macroeconomic policies, or any of the other theoretically plausible channels we consider, should be one of the major areas of intervention for economic recovery of fragile states, in line with the prescriptions of the Washington consensus.

Scenario 2: If both the effects of state fragility and macroeconomic policies are found to be jointly significant, this could probably mean that both explanatory variables have independent effects on economic outcome. In essence, some of the effects of state fragility may be mediated through macroeconomic policies, whereas, some may not. To ascertain the extent to which the macroeconomic variable of interest is a mechanism for transmission of the effect of state fragility to macroeconomic outcomes, we examine the change in the coefficient on state fragility, β, in the equation with and without the macroeconomic policy variable. If the coefficient changes in a significant way, it would mean that the macroeconomic policy variable is a primary channel by which the effect of state fragility is passed on to macroeconomic volatility and performance. Otherwise, it is not.

Scenario 3: Lastly, if we find that the coefficient on state fragility, β, is significant while that of the relevant macroeconomic policy is not, the most plausible interpretation is that the causal effect of state fragility is not mediated through macroeconomic policies,

but could be through a range of other microeconomic and agent-based optimization decisions, e.g., consumption and investments, or through international interventions, e.g., aid. Although this does not rule out the possibility that macroeconomic policies receive knock-on effects from state fragility, which it passes over to macroeconomic volatility and performance, the main point is that, by not being significant, it does not constitute in itself a systematic transmission mechanism from state fragility to macroeconomic volatility. This would likely be the result if the so-called "seesaw effect", enunciated by Acemoglu et al. (2003, p. 54), is in operation.

4.5 What-if experiments, dynamic interactions, and robustness

Until now, we have specified the analysis of the relationship between state fragility and macroeconomic performance by abstracting from dynamic interactions and potential feedback effects between state fragility and macroeconomic policies and outcomes using carefully designed instrumentation techniques to switch-off those effects a priori. In this section, we relax those restrictions by utilizing a panel structural vector autoregression (SVAR), which treats all the variables in the system as endogenous and also accounts for unobserved individual heterogeneity.[8]

The nature of the thought experiments we are interested in are as follows: (i) If there is a sudden and unexpected rise in the level of state fragility (perhaps a one standard deviation increase), what would be the immediate and dynamic responses of macroeconomic policy and outcome variables? (ii) If there is a sudden and unexpected increase in the level of macroeconomic volatility or crisis, what would be the immediate and dynamic responses of state fragility and macroeconomic policy variables? To understand these dynamic interrelationships, we consider a structural VAR of the form;

$$\boldsymbol{y}'\boldsymbol{A}_0 = \sum_{j=1}^{p} \boldsymbol{y}'_{i,t-j}\boldsymbol{A}_j + \boldsymbol{c} + \mu_i + \boldsymbol{\epsilon}'_{i,t}; \quad t = 1, \ldots, T \tag{9}$$

where $\boldsymbol{y}$ is an $n \times 1$ vector of endogenous variables, ϵ_t is an $n \times 1$ vector of structural shocks, $\boldsymbol{A}_j, j = 1, \ldots, p$ is an $n \times n$ matrix of structural parameters, $\boldsymbol{A}_0$ is an invertible matrix of contemporaneous structural restrictions, μ_i is the unobserved individual heterogeneity, and p is the lag length.

Our interest lies in the impulse response functions that are generated from the reduced form estimates from Eq. (9). We adopt a simple identification strategy to decompose the residuals and make them orthogonal to each other. This follows the convention of (theoretically or heuristically) ordering the variables in such a way that any correlation between the residuals of any two elements is allocated to the variable that comes first in

[8]See for example, Love and Zicchino (2006) for a related application on the effects of financial development on investment behaviour at the firm level for 36 countries.

the ordering. In order words, preceding variables in the ordering are more exogenous than variables that come later in the ordering.[9] The ordering of the variables are as follows: {*Fragility, Fiscal Burden, Exchange rate, Inflation, Volatility*}. This ordering implies that state fragility is the most weakly exogenous variable in the system, while macroeconomic volatility is the most endogenously determined variable in the system, being affected by contemporaneous shocks to all the other variables. We also experiment with alternative identification strategies. The one specified above, however, seemed to be the most plausible.

To examine the robustness of the results from the baseline system GMM specification outlined in the previous section, we consider the sensitivity of the results to alternative estimation strategies, alternative measures of state fragility, and different sample periods. In particular, having noticed from the stylized facts and descriptive statistics that some variables for some countries are outliers when compared to the rest, there could be a possibility that some of our results may be driven by influential outliers. To control for this problem, we also estimate the baseline fundamental equation, Eq. (8), using Jackknife GMM methods, which simply implements a leave-one-out resampling estimation technique.[10] Secondly, we also conduct robustness tests by using three different dimensions of state fragility; political fragility, social fragility, and security fragility. Finally, we conduct inter-decadal analysis, comparing the nature of the relationship in the pre-2000 and post-2000 sub-periods.

5 Results and discussion

5.1 A first look at the evidence

We begin by presenting suggestive results that go to demonstrate, in a broad sense, what the nature of the relationship between state fragility and macroeconomic outcomes have been in sub-Saharan Africa. A more rigorous examination, using panel data and internal instrumentation (IV) techniques follow in subsequent sections. In Table 1, we present cross-sectional OLS regression results with data averaged over the entire sample period so that there is one observation per country. We consider four different measures of macroeconomic outcome: volatility, crisis, performance, and income.

The results from the baseline estimation equation presented in Table 1 clearly show that state fragility has a significant and economically non-trivial effect on macroeconomic outcomes, the only exception being for macroeconomic performance. In particular, the

[9]This identification strategy is known, in econometric jargon, as the Choleski decomposition of the variance-covariance matrix of residuals. The implication is that variables that appear earlier in the ordering affect variables that appear later contemporaneously, as well as with a lag, whereas, the variables that appear latter only affects the former variables with a lag, (see the book-length treatment in Enders, 2015).

[10]This estimator is not to be confused with the recently developed Jackknife-GMM by Newey and Windmeijer (2009). What we simply do is to run the system GMM regressions, dropping one country at a time, to see if any data observation is overly influential in driving the results.

Table 1: Effect of state fragility on macroeconomic outcomes: cross sectional regressions

	Volatility		Crisis		Performance		Income	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fragility	0.275***	0.277***	0.989***	0.935***	0.027	0.002	-0.059***	-0.009
	(0.079)	(0.093)	(0.289)	(0.335)	(0.066)	(0.076)	(0.024)	(0.007)
Controls								
Initial income		0.019		-0.550		-0.479		0.970***
		(0.478)		(2.038)		(0.514)		(0.051)
Openness	0.144	0.130	-0.997	-0.604	-2.803***	-2.193*	1.015***	-0.220**
	(0.869)	(0.945)	(4.852)	(5.110)	(1.135)	(1.225)	(0.381)	(0.107)
Diversification	-0.046	-0.046	-0.261*	-0.276*				
	(0.037)	(0.039)	(0.164)	(0.172)				
Aid	-0.513	-0.511	-2.459	-2.534				
	(0.326)	(0.337)	(1.757)	(1.805)				
Financial depth	0.012	0.011	0.039	0.044				
	(0.010)	(0.011)	(0.040)	(0.046)				
Investment					0.130***	0.139***	0.034***	0.016***
					(0.030)	(0.033)	(0.006)	(0.003)
Primary enrolment					0.012	0.014	0.005	0.002
					(0.019)	(0.018)	(0.005)	(0.002)
FDI					0.435***	0.373***	-0.082***	0.041***
					(0.061)	(0.090)	(0.021)	(0.009)
Constant	11.293	11.124	65.942	70.806	10.553**	11.374**	2.584	0.923**
	(8.774)	(9.852)	(54.184)	(57.587)	(4.886)	(5.296)	(1.829)	(0.468)
SSA Countries	42	42	42	42	44	44	44	44

Notes: All regressions are cross-sectional with one averaged observation per country. The titles of the columns give an indication of the dependent variable for the results in that column. The initial income is the log of 1980 per capita income value for each country. Standard errors are in parenthesis, and significance levels for rejection of null hypothesis are: *** for 1 %, ** for 5% , and * for 10% levels respectively.

results imply that higher levels of state fragility, on average, would lead to higher levels of macroeconomic volatility and crises but induce lower levels of per capita income. These conclusions are true for volatility and crisis, even when we control for initial income levels, but it breaks down in the income equation. The insignificant relationship, which we observe between state fragility and macroeconomic performance, measured by GDP growth per capita, should not come as a surprise. The reason being that the index of state fragility also takes into account dimensions of economic fragility measured using economic growth indicators. This feature implies that macroeconomic performance is an underlying fundamental for state fragility measurement, and hence they are strongly correlated, therefore it is difficult to disentangle any causal relationships. In fact, because of this general pattern observed throughout most of the regressions results; whereby the effect of state fragility on macroeconomic performance (growth) is not robust, we decided to drop macroeconomic performance, or at best omit the discussion of its coefficients, as a measure of macroeconomic outcome in the rest of the paper.

To demonstrate the implication of our results for how state fragility could drive an economy into greater macroeconomic volatility or crisis, take two examples; Botswana and Zimbabwe. The coefficient on state fragility when we control for initial income (see column 2 in Table 1) is 0.277. This implies that a country like Zimbabwe, with an average

state fragility index of 16.87, is predicted to suffer about three-one-third (3.34) times more macroeconomic volatility than a country like Botswana with a fragility index of 4.8.[11] The impact of state fragility on crisis is even more magnified, as the coefficient implies that a one unit increase in state fragility leads to about 0.9 of a percentage point increase in the level of worst output drop.

Although these results provide robust evidence of the effect of state fragility on macroeconomic outcomes, they are meant to be indicative. This is especially so because the cross-sectional regressions do not exploit the panel features, and hence, the time varying properties of the data. The implication is that properties such as the great moderation and periods of abnormal growth in Africa are not accounted for. Also, reverse causation and measurement error problems are likely to pervasive in studies like this. These weaknesses may probably explain the reason why there are hardly any significant control variables in the volatility and crisis regressions. We now consider results from the system GMM regressions.

The results from the SGMM regressions, using a panel of non-overlapping five-year averages, from 1995 to 2014 are presented in Table 2. The important feature of this estimation technique is that we treat state fragility and macroeconomic outcomes as endogenously determined. In fact, all the other control variables, except the time dummies, are also treated as endogenous or predetermined. This is in line with the common observation that macroeconomic volatility and crisis are affected by and affects most macroeconomic variables, especially the kind of control variables we use here. Some of the possible channels of interaction are discussed in subsequent section (also see Aizenman and Pinto (2005)). The instruments for the first difference equation are the second and third lags of all the variables, while the instruments for the levels equation are the one-period lags of the first differences of all the variables. The covariance matrix of moments is based on a two-step estimation of the optimal weighting matrix, with robust standard errors clustered by country. Because this procedure leads to a downward bias in the standard errors, the robust standard errors calculated are based on the Windmeijer (2005) Taylor series expansion based correction method.

The results from the SGMM estimation, presented in Table 2, mostly re-validates the results from the cross-sectional regressions in Table 1, but with additional insightful guidance. In Columns 2, 4, and 6, of Table 2, the results for the regression of macroeconomic volatility, crisis, and performance on state fragility, while controlling for other determinants of volatility, are presented. One common pattern we notice is that when we control for initial income, the effect of state fragility on the different measures of macroeconomic outcomes are dampened, and even though the introduction of initial income variable almost leads to a doubling of the standard errors, the effect on volatility and crisis are still

[11] The predicted results come very close to the observed data which shows that the average macroeconomic volatility in Zimbabwe is 6.58, about two times more than the average volatility of 3.78 observed in Botswana.

Table 2: Effect of state fragility on macroeconomic outcomes: system GMM regressions

	Volatility		Crisis		Performance	
	(1)	(2)	(3)	(4)	(5)	(6)
Macro outcome lagged	-0.095***	-0.104***	-0.074***	-0.069***	0.089***	0.132***
	(0.015)	(0.015)	(0.009)	(0.018)	(0.033)	(0.030)
Fragility	0.303***	0.217***	0.716***	0.528***	-0.044	-0.004
	(0.014)	(0.035)	(0.042)	(0.069)	(0.108)	(0.116)
Controls						
Initial income		-0.055		-0.473		0.230
		(0.150)		(0.334)		(0.256)
Diversification	-0.078***	-0.133***	-0.225***	-0.311***		
	(0.015)	(0.012)	(0.025)	(0.028)		
Aid	-1.393***	-1.145***	-3.380***	-2.838***		
	(0.116)	(0.065)	(0.189)	(0.315)		
FDI	0.001	-0.075***	-0.069***	-0.153***		
	(0.009)	(0.009)	(0.025)	(0.020)		
Financial depth	0.058***	0.065***	0.155***	0.159***	-0.021**	-0.017**
	(0.003)	(0.002)	(0.008)	(0.008)	(0.009)	(0.008)
Investments					0.162***	0.134***
					(0.010)	(0.011)
Openness					0.027***	0.026***
					(0.007)	(0.006)
Primary enrolment					0.027	0.028
					(0.027)	(0.024)
Constant	28.713***	28.214***	71.650***	70.943***	0.001	-4.200
	(2.606)	(2.305)	(3.481)	(7.768)	(0.001)	(3.929)
No. of observations	119	119	119	119	119	119
No. of SSA countries	42	42	42	42	43	43
No. of instruments	48	45	43	45	33	35
Hansen J test	35.42	33.93	36.76	31.78	21.35	18.42
p-value	0.72	0.61	0.43	0.71	0.50	0.73
Arellano-Bond AR(1) test	-1.49	-1.51	-1.52	-1.57	0.20	-0.02
p-value	0.14	0.13	0.13	0.12	0.84	0.98

Notes: Results are based on SGMM regressions, as in Blundell and Bond (1998), for five-year averages over the sample period 1995 to 2014. All explanatory variables are treated as predetermined or weakly exogenous variables. The instruments for the first difference equation are the second and third lags of all the variables, while the instruments for the levels equation are the one period lag of the first differences of all the variables. The covariance matrix of moments is based on a two-step estimation of the optimal weighting matrix with robust standard errors clustered by country. Robust standard errors are in parenthesis, and significance levels for rejection of null hypothesis are: *** for 1 %, ** for 5% , and * for 10% levels respectively.

significant at the 1 percent level. As commonly observed in the literature, our result for the initial income, which is meant to capture convergence effects, has a negative coefficient, but it is not statistically significant in all the regressions.

The observed pattern whereby the effect of state fragility on macroeconomic outcomes is dampened by the introduction of the initial income is similar to the results that Acemoglu et al. (2003) found in their study of institutions and post-war economic performance, in which the impact of institutions on volatility and growth becomes substantially weaker when they control for initial income. In our case, this is likely to be explained by the stylized fact that income levels and state fragility indices are highly correlated. To be

specific, the volatility-inducing effect of state fragility, without controlling for initial income, is about 0.3 of a percentage point, and it is dampened by about 10 basis points when we control for initial income. Interestingly, unlike in the cross-sectional regressions, the sign of the coefficient on state fragility in the macroeconomic performance SGMM regressions, (see Columns 5 and 6 of Table 2), assume the expected negative signs, but they are not statistically or economically significant.

Moving on to the control variables, we examine how each of them affects macroeconomic volatility after controlling for initial income (see Column 2 in Table 2). Diversification is expected to create more opportunities and windows for an economy to smooth out shocks, so that economies with high skilled sectors, such as the services sector, are more likely to have better shock absorbers, see Mobarak (2005) and Klomp and de Haan (2009). The result shows that diversification, measured as the value added of the services sector in overall GDP, has a statistically significant negative effect in the volatility and crisis regressions of Table 2. The implication is that, more diversified economies are likely to have less volatile macroeconomic outcomes. In the literature, the effect of aid on macroeconomic volatility and performance can at best be described as being nisi (see for examples Lensink and White (2000), Hansen and Tarp (2001), Lensink and Morrissey (2000), and Easterly et al. (2003)), our result, however, shows that aid significantly dampens macroeconomic volatility and crisis.

The effect of FDI on volatility and crisis, when we control for initial income, is also dampening, and this goes to validate the results in Lensink and Morrissey (2000) that aid improves economic growth and hence dampens volatility through the investment channel. Further, our results show that financial depth, measured in terms of private sector credit to GDP, has a magnifying effect on macroeconomic volatility and outcome. This result could be interpreted in the light of the works of Easterly et al. (2001), which shows a non-linear relationship between volatility and financial depth, in which well-developed financial systems offer an opportunity for stabilization, but could also be a source of increased systemic risk and instability due to its increasing effect on the leverage of firms. Overall, the control variables show that countries that are richer, more diversified, receive more aid and FDI, are less volatile, while countries that have greater financial depth are more volatile.

The reliability of our results partly depends on the validity and relevance of our instrumentation technique in the system GMM regressions. To examine these properties, we report some model diagnostic tests in the lower segment of Table 2. We consider two tests. The first is the Hansen J test of over-identifying restrictions, which is a test of the overall validity of the instruments based on a comparison of the empirical analogue of the theoretical moment conditions used in the estimation, and the second is the Arellano-Bond AR(1) test, which is used to test the hypothesis that the error terms are not serially correlated. Because we are not able to reject the null hypothesis for the two tests for all

the regressions, we conclude that there is no evidence of misspecification in the model, and there is also no evidence of first and second order serial correlation in the residuals, thereby satisfying the assumptions underlying the application of the SGMM regression.[12]

5.2 State fragility versus macroeconomic policies: what drives macroeconomic outcomes?

To investigate the view that macroeconomic policies are the primary determinants of macroeconomic outcomes, we regress our measures of macroeconomic outcomes, without controlling for state fragility, on three key measures of macroeconomic policy; (i) fiscal burden, measured in terms of the size of government expenditure-to-GDP, (ii) effectiveness of monetary policy, measured as the annual changes in the consumer price index, and (iii) exchange rate misalignment, measured in terms of the rate of change in the real effective exchange rate.[13] The results for the SGMM regressions for this investigation are presented in Table 3.

Although the results on the effect of macroeconomic policies on macroeconomic outcomes are generally in line with the communique from the Washington consensus, i.e., macroeconomic policies determine macroeconomic outcomes, the statistical significance seems to vary, depending on what is controlled for. For example, the dampening effect of fiscal burden on macroeconomic volatility and crisis are barely significant at the 10 percent level, and it completely loses its significance in the macroeconomic performance regressions when we control for initial income. This dampening effect is consistent with the stylized facts plotted in Panel 1 of Figure 3. However, when compared to the results of Acemoglu et al. (2003), that perform cross-sectional regressions with a worldwide sample and find that greater government size is associated with greater instability, our results are fundamentally different. This may be explained by the fact that Acemoglu et al. (2003) did not control for institutions in their baseline regression, because when they do eventually, the results lose statistical significance.

For macroeconomic volatility, the results show that fiscal burden has a dampening effect, somewhere around -0.2 of a percentage point when we control for initial income (see Column 2). Inflation has a significant volatility-inducing effect, around 0.4 of a percentage point, while exchange rate variability also has a robust volatility-inducing effect, somewhere around 0.26 of a percentage point (see Column 6). The pattern of the effects of the

[12]Note that unlike conventional tests, the null hypothesis for these tests are constructed in the affirmative (see Baltagi, 2008, Chap. 8). For the sake of space, the results from the Arellano-Bond AR(2) tests, and the related p-values are not reported here. However, just like the AR(1) test results, they all indicate no evidence of second-order serial correlation in the residuals. The results are available from the authors upon request.

[13]We have decided to use government consumption-in-GDP, instead of the budget deficit as our measure of fiscal burden because it is known to be a better predictor of macroeconomic performance (see for examples Acemoglu et al. (2003), Mobarak (2005), and Klomp and de Haan (2009)).

macroeconomic policy variables on crisis is very similar to that of volatility, but with much stronger effects, though the effect of exchange rate variability on crisis is not statistically significant at conventional levels. On the other hand, the effect of macroeconomic policies on macroeconomic performance, measured in terms of GDP per capita growth, is robust and consistent with the theoretical expectations. In particular, the results show that fiscal burden, inflation, and exchange rate variability negatively and significantly affect growth, at conventionally significant levels (see Columns 13-18 of Table 3).

Table 3: Effect of macroeconomic policy on macroeconomic outcomes: system GMM regressions

	Volatility						Crisis						Performance					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Macro outcome lagged	-0.052	-0.063	-0.051***	-0.029*	-0.049**	-0.012	-0.037	-0.042	-0.008	0.001	-0.045	0.001	0.130***	0.112***	-0.184**	0.196***	-0.119***	0.222***
	(0.117)	(0.130)	(0.019)	(0.017)	(0.024)	(0.036)	(0.115)	(0.124)	(0.016)	(0.016)	(0.123)	(0.141)	(0.025)	(0.035)	(0.080)	(0.067)	(0.013)	(0.014)
Fiscal burdren	-0.184*	-0.200**					-0.425*	-0.474*					-0.071**	-0.048				
	(0.115)	(0.104)					(0.262)	(0.253)					(0.036)	(0.047)				
Inflation			0.372***	0.400***					0.939***	1.228***					-0.034***	-0.010		
			(0.054)	(0.065)					(0.150)	(0.170)					(0.011)	(0.099)		
Exchange rate variability					0.128***	0.267***					0.375	0.796					-0.004**	-0.005**
					(0.038)	(0.099)					(0.721)	(0.884)					(0.002)	(0.002)
Controls																		
Diversification	-0.066	-0.059	-0.140***	-0.122***	-0.104***	-0.072***	-0.158	-0.165	-0.314***	-0.295***	-0.243*	-0.165						
	(0.084)	(0.067)	(0.010)	(0.006)	(0.010)	(0.008)	(0.210)	(0.165)	(0.025)	(0.019)	(0.146)	(0.159)						
Aid	-1.402***	-1.765***	-0.882***	-1.288***	-0.757***	-1.023***	-3.435***	-4.384***	-2.146***	-3.552***	-1.925***	-2.781***						
	(0.473)	(0.540)	(0.054)	(0.121)	(0.037)	(0.122)	(1.165)	(1.322)	(0.180)	(0.269)	(0.781)	(1.193)						
Financial depth	0.058***	0.061**	0.048***	0.056***	0.054***	0.052***	0.140**	0.146**	0.117***	0.135***	0.118**	0.132***	-0.006	0.002	-1.444**	0.005	-1.501***	-0.007*
	(0.025)	(0.028)	(0.002)	(0.004)	(0.004)	(0.003)	(0.061)	(0.070)	(0.008)	(0.011)	(0.060)	(0.051)	(0.004)	(0.009)	(0.757)	(0.023)	(0.177)	(0.005)
FDI	-0.070	-0.017	-0.081***	-0.019	-0.097***	-0.056***	-0.201	-0.067	-0.179***	-0.074	-0.265*	-0.150						
	(0.066)	(0.072)	(0.007)	(0.017)	(0.005)	(0.018)	(0.170)	(0.226)	(0.032)	(0.049)	(0.164)	(0.170)						
Initial income		-0.732		-0.882***		-0.324*		-1.758		-2.368***		-1.131		-0.904***		-0.798		-0.768***
		(0.842)		(0.143)		(0.178)		(2.159)		(0.278)		(1.851)		(0.322)		(0.607)		(0.205)
Constant	35.639***	47.396***	25.705***	38.371***	21.662***	27.130***	86.793***	117.968***	60.844***	102.782***	54.578***	73.241**						
	(11.400)	(16.043)	(1.439)	(3.396)	(1.158)	(3.852)	(27.891)	(40.006)	(4.692)	(7.439)	(18.964)	(35.515)						
Investment													0.153***	0.188***	0.151*	0.112***	0.034*	0.121***
													(0.012)	(0.018)	(0.086)	(0.041)	(0.022)	(0.009)
Openness													0.016***	0.012***	0.010	0.014	2.774***	0.019***
													(0.004)	(0.004)	(0.013)	(0.013)	(0.272)	(0.004)
Primary enrolment													0.029	0.048	0.054	0.033	0.033***	0.013
													(0.023)	(0.036)	(0.037)	(0.082)	(0.011)	(0.022)
No. of observations	117	117	121	119	123	121	117	117	121	119	123	121	122	122	110	118	114	122
No. of SSA countries	42	42	43	42	44	43	42	42	43	42	44	43	44	44	42	43	43	44
No. of instruments	43	45	43	40	43	40	43	45	43	40	43	40	33	29	33	34	33	34
Hansen J test	33.72	36.92	33.42	30.99	32.40	26.54	33.07	37.85	33.24	31.30	35.28	27.18	22.56	15.91	24.73	24.23	30.33	20.81
p-value	0.58	0.47	0.59	0.52	0.64	0.74	0.61	0.43	0.60	0.50	0.50	0.71	0.43	0.53	0.31	0.34	0.25	0.53
Arellano-Bond AR(1) test	-1.57	-1.59	-1.70	-1.71	-1.77	-1.92	-1.48	-1.51	-1.72	-1.72	-1.40	-1.50	-0.14	0.10	-0.65	-0.39	-1.02	-0.86
p-value	0.12	0.11	0.09	0.09	0.08	0.06	0.14	0.13	0.08	0.09	0.16	0.13	0.89	0.92	0.52	0.70	0.31	0.39

Notes: Results are based on SGMM regressions, as in Blundell and Bond (1998), for five-year averages over the sample period 1995 to 2014. All explanatory variables are treated as predetermined or weakly exogenous variables. The instruments for the first difference equation are the second and third lags of all the variables, while the instruments for the levels equation are then one period lags of the first differences of all the variables. The covariance matrix of moments is based on a two-step estimation of the optimal weighting matrix with robust standard errors clustered by country. Robust standard errors are in parenthesis, and significance levels for rejection of null hypothesis are: *** for 1 %, ** for 5% , and * for 10% levels respectively.

Since the results, so far, show that macroeconomic policies, as well as state fragility, are robust drivers of macroeconomic outcomes in sub-Saharan Africa, then it could be that they both have independent effects on macroeconomic outcomes or the effect of state fragility on macroeconomic outcomes is indirect through its impact on macroeconomic policies. This kind of phenomenon is often referred to as the seesaw effect: whereby, because of the fragile situation of a state, groups in power (or politicians in a democracy) use distortionary macroeconomic policies that change rapidly and repeatedly from one position to another, depending on the form of resistance they face, to achieve their goals, enrich themselves and continue to remain in power (see Acemoglu et al., 2003, p. 108). To better understand what the mechanisms could be, we first investigate the notion of the seesaw effect, i.e., whether state fragility has a robust effect on macroeconomic policies. The results from such an investigation is reported in Table 4.

Table 4: Effect of state fragility on macroeconomic policies: system GMM regressions

	Fiscal burden	Inflation	Exchange rate
	(1)	(2)	(3)
Fiscal burden lagged	0.518***		
	(0.082)		
Inflation lagged		1.422***	
		(0.046)	
Exchange rate variability lagged			0.246***
			(0.029)
Fragility	0.286**	1.583***	6.215***
	(0.126)	(0.345)	(1.150)
Controls			
Diversification	0.107	0.931***	-0.880
	(0.083)	(0.264)	(0.743)
Financial depth	-0.001	-0.968	10.511**
	(0.022)	(0.903)	(5.439)
Openness		0.058	0.645***
		(0.079)	(0.190)
Constant	-2.477	-73.762***	-90.326*
	(4.361)	(13.614)	(51.777)
No. of observations	111	101	112
No. of SSA countries	39	38	41
No. of instruments	23	28	25
Hansen J test	19.96	20.76	18.75
p-value	0.33	0.54	0.47
Arellano-Bond AR(1) test	-0.97	-1.14	-0.66
p-value	0.33	0.25	0.51

Notes: Results are based on SGMM regressions, as in Blundell and Bond (1998), for five-year averages over the sample period 1995 to 2014. All explanatory variables are treated as predetermined or weakly exogenous variables. The instruments for the first difference equation are the second and third lags of all the variables, while the instruments for the levels equation are then one period lag of the first differences of all the variables. The covariance matrix of moments is based on a two-step estimation of the optimal weighting matrix with robust standard errors clustered by country. Robust standard errors are in parenthesis, and significance levels for rejection of null hypothesis are: *** for 1 %, ** for 5% , and * for 10% levels respectively.

Interestingly, the results in Table 4 show that state fragility has a positive effect on

fiscal burden, inflation, and exchange rate variability with the estimated effects all being statistically significant at conventional levels. The implication of these results is that there are many plausible explanations for the relationship between state fragility, macroeconomic policies, and macroeconomic outcomes. In other words, macroeconomic policy could be the systematic channel through which state fragility affects macroeconomic performance, it could also have its independent effects on macroeconomic outcomes, or yet, the effect of state fragility might not even be working through any particular mechanism, but through a gamut of microeconomic, external, and possibly exogenous factors. The next section endeavours to search for the plausible channels of transmission from state fragility to macroeconomic outcomes.

5.3 Probing further: in search of plausible mechanisms

In search of the potential channels and mechanisms through which state fragility affects macroeconomic outcomes, we run SGMM regressions with macroeconomic volatility as the dependent variable, including state fragility and each of the macroeconomic policy variables in turn and jointly as explanatory variables. The results are presented in Table 5. For columns (1) to (3), in addition to state fragility, we incrementally include fiscal burden, inflation, and exchange rate volatility as additional explanatory variables; while column (4) includes all the policy variables on the right-hand side. The interpretation of the results follow the indicative recommendations by Acemoglu et al. (2003) earlier described in the methodology section of this paper. In particular, we use the statistical significance of the state fragility and macroeconomic policy coefficients, and the extent of change in the estimated state fragility coefficient to make inference about which of the three scenarios earlier described are the most plausible channels of transmission in the context of sub-Saharan Africa.

The results in column (1) of Table 5 are consistent with *Scenario 2*. That is, a situation where both state fragility and the macroeconomic policy of interest, i.e., fiscal burden, are jointly significant. This result implies that both state fragility and fiscal burden have independent effects on macroeconomic volatility. In essence, it is possible that some of the effects of state fragility is mediated through its impact on the size of government. To ascertain the extent to which fiscal burden is a mechanism for the transmission of the effect of state fragility on macroeconomic volatility, we evaluate the difference in the value of the coefficient on state fragility without fiscal burden on the right hand side, i.e., 0.303 in Table 2, against the value of the coefficient on state fragility with fiscal burden on the right hand side, i.e., 0.325 in Table 5. Although the difference is minuscule, only about 2.2 basis points, the statistical significance leaves the impression that fiscal burden is a relevant channel by which state fragility partially affects macroeconomic outcomes.

The results with the introduction of the other policy variables, i.e., inflation and

Table 5: Searching for the mechanism: state fragility versus macroeconomic policy

	Fiscal burden	Inflation	Exchange rate	All macro policy
	(1)	(2)	(3)	(4)
Lagged macroeconomic outcome	-0.110	-0.059	-0.047	-0.019
	(0.136)	(0.140)	(0.173)	(0.165)
State fragility	0.325***	0.335**	0.305**	0.319*
	(0.135)	(0.145)	(0.143)	(0.188)
Fiscal burden	-0.254*			-0.185
	(0.154)			(0.140)
Inflation		0.383		0.235
		(0.505)		(0.509)
Exchange rate volatility			0.053	0.139
			(0.431)	(0.384)
Controls				
Diversification	0.011	-0.046	-0.055	0.008
	(0.076)	(0.055)	(0.074)	(0.070)
Aid	-1.834***	-1.416***	-1.291**	-1.981***
	(0.568)	(0.579)	(0.581)	(0.764)
Financial depth	0.052*	0.059**	0.060**	0.050*
	(0.029)	(0.029)	(0.028)	(0.029)
FDI	0.064	0.028	0.004	0.030
	(0.087)	(0.076)	(0.088)	(0.075)
Constant	36.709***	26.363**	25.466*	38.994***
	(11.681)	(12.075)	(13.852)	(16.105)
No. of observations	114	116	118	111
No. of SSA countries	41	41	42	40
No. of instruments	43	43	43	53
Hansen J test	31.77	36.93	35.51	29.40
p-value	0.62	0.38	0.44	0.94
Arellano-Bond AR(1) test	-1.40	-1.30	-1.29	-1.41
p-value	0.16	0.19	0.20	0.16

Notes: The dependent variable for all the regressions is macroeconomic volatility. Results are based on SGMM regressions, as in Blundell and Bond (1998), for five-year averages over the sample period 1995 to 2014. All explanatory variables are treated as predetermined or weakly exogenous variables. The instruments for the first difference equation are the second and third lags of all the variables, while the instruments for the levels equation are then one period lag of the first differences of all the variables. The covariance matrix of moments is based on a two-step estimation of the optimal weighting matrix with robust standard errors clustered by country. Robust standard errors are in parenthesis, and significance levels for rejection of null hypothesis are: *** for 1 %, ** for 5% , and * for 10% levels respectively.

exchange rate volatility, in turn, are slightly different, as they match the description of *Scenario 3*, whereby state fragility is significant while the policy variables are not. The implication is that the causal effect of state fragility is not mediated through these macroeconomic policy variables, but could be through a range of other microeconomic, foreign or exogenous channels. This conclusion is further validated by the results in column (4) of Table 5 where we include all the macroeconomic policy variables and state fragility on the right-hand side. Although state fragility continues to be significant at the 10 percent level, none of the macroeconomic policy variables have a significant coefficient, suggesting that all of them, put together, do not constitute a systematic transmission mechanism from state fragility to macroeconomic volatility.

Having concluded from our results that macroeconomic policy is not the primary channel through which state fragility affects macroeconomic outcomes, we probe further by considering other potential mechanism through which state fragility could affect macroeconomic volatility. In particular, we consider the finance channel, suggested by, among others, Easterly et al. (2001), the aid channel, suggested by, among others, Jones and Tarp (2016), the investment channel suggested by Aizenman and Pinto (2005) among others, and the global shocks channel. The results from this exercise are presented in Table 6.

Table 6: Probing further: channels of transmission from state fragility to macroeconomic volatility

	Finance channel		Aid channel		Investment channel		Global shocks	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged volatility	-0.002	-0.076***	-0.033	-0.020	0.036	-0.073	-0.103	-0.055
	(0.145)	(0.014)	(0.152)	(0.034)	(0.108)	(0.210)	(0.152)	(0.133)
State fragility	0.213	0.202***	0.209	0.178***	0.219	0.185	0.284**	0.523
	(0.163)	(0.026)	(0.140)	(0.020)	(0.145)	(0.165)	(0.130)	(0.354)
Financial depth		0.010**	0.067**	0.050***	0.046**	0.062*	0.057**	0.034
		(0.005)	(0.029)	(0.002)	(0.020)	(0.033)	(0.027)	(0.025)
State fragility*Financial depth		0.004***						
		(0.000)						
Aid	-1.340**	-1.304***		-0.550***	-1.251***	-1.393**	-1.445***	-0.862
	(0.687)	(0.113)		(0.228)	(0.416)	(0.612)	(0.399)	(0.807)
State fragility*Aid				-0.031***				
				(0.012)				
FDI	-0.053	0.014	-0.094	-0.010		-0.306	-0.033	0.007
	(0.098)	(0.009)	(0.096)	(0.013)		(0.233)	(0.079)	(0.095)
State fragility*FDI						0.019		
						(0.015)		
World GDP growth							0.050	-0.707
							(2.254)	(4.481)
State fragility*World GDP growth								0.778
								(1.080)
Diversification	-0.032	-0.076***	-0.143*	-0.086***	-0.070	-0.108	-0.092*	-0.049
	(0.065)	(0.008)	(0.086)	(0.010)	(0.046)	(0.076)	(0.053)	(0.053)
Constant	28.051**	28.162***	5.222	14.568***	26.632***	31.787**	30.648**	16.951
	(14.042)	(2.314)	(5.072)	(4.541)	(8.504)	(14.734)	(13.619)	(25.624)
No. of observations	123	119	119	119	119	119	119	119
No. of SSA countries	42	42	42	42	42	42	42	42
No. of instruments	33	43	33	43	33	43	40	50
Hansen J test	27.39	37.90	25.49	36.27	19.29	34.95	33.01	29.61
p-value	0.44	0.34	0.55	0.41	0.86	0.47	0.42	0.89
Arellano-Bond AR(1) test	-1.70	-1.49	-1.32	-1.64	-1.60	-1.29	-1.28	-1.32
p-value	0.09	0.14	0.19	0.10	0.11	0.20	0.20	0.19

Notes: The dependent variable for all the regressions is macroeconomic volatility. Results are based on SGMM regressions, as in Blundell and Bond (1998), for five-year averages over the sample period 1995 to 2014. All explanatory variables are treated as predetermined or weakly exogenous variables. The instruments for the first difference equation are the second and third lags of all the variables, while the instruments for the levels equation are then one period lag of the first differences of all the variables. The covariance matrix of moments is based on a two-step estimation of the optimal weighting matrix with robust standard errors clustered by country. Robust standard errors are in parenthesis, and significance levels for rejection of null hypothesis are: *** for 1 %, ** for 5% , and * for 10% levels respectively.

Starting with the finance channel in columns (1) and (2) of Table 6, we observe that when financial depth is not included as an explanatory variable, the coefficient on state fragility looses its significance. In one sense, this is comparable to *Scenario 1* described earlier, whereby state fragility is insignificant and the potential channel of transmission is significant (although this is not exactly the case, as we did not include the finance variable in this regression). This result, however, implies that the effect of state fragility on

macroeconomic volatility is partially mediated through the finance channel. This conclusion is validated in column (2), where we include financial depth and its interaction with state fragility on the right-hand side of the regression, we find that the three coefficients of interest are significant at conventional levels.

The positive and significant coefficient on the interaction term between state fragility and financial depth implies that fragile states with more developed financial sectors have a greater propensity to experience macroeconomic problems (i.e. volatility) as the state becomes more fragile. The results from the experiment of the aid-channel also indicate that aid dynamics is a mediating channel for the effect of state fragility on macroeconomic outcomes. In particular, when aid is removed from the equation, see column 3 of Table 6, state fragility loses its significance. But when aid and the interaction between aid and state fragility are introduced in column 4, state fragility, aid, and its interaction term become statistically significant. The negative sign on the aid coefficient and its interaction with state fragility suggest that aid flows help to dampen macroeconomic volatility and fragile states with greater aid flows are more likely to experience lower macroeconomic volatility. These results are plausible, given that aid could be channeled towards better macroeconomic and political governance, aggregate security, and the provision of social amenities, which could then dampen possible macroeconomic shocks and volatility arising from state fragility.

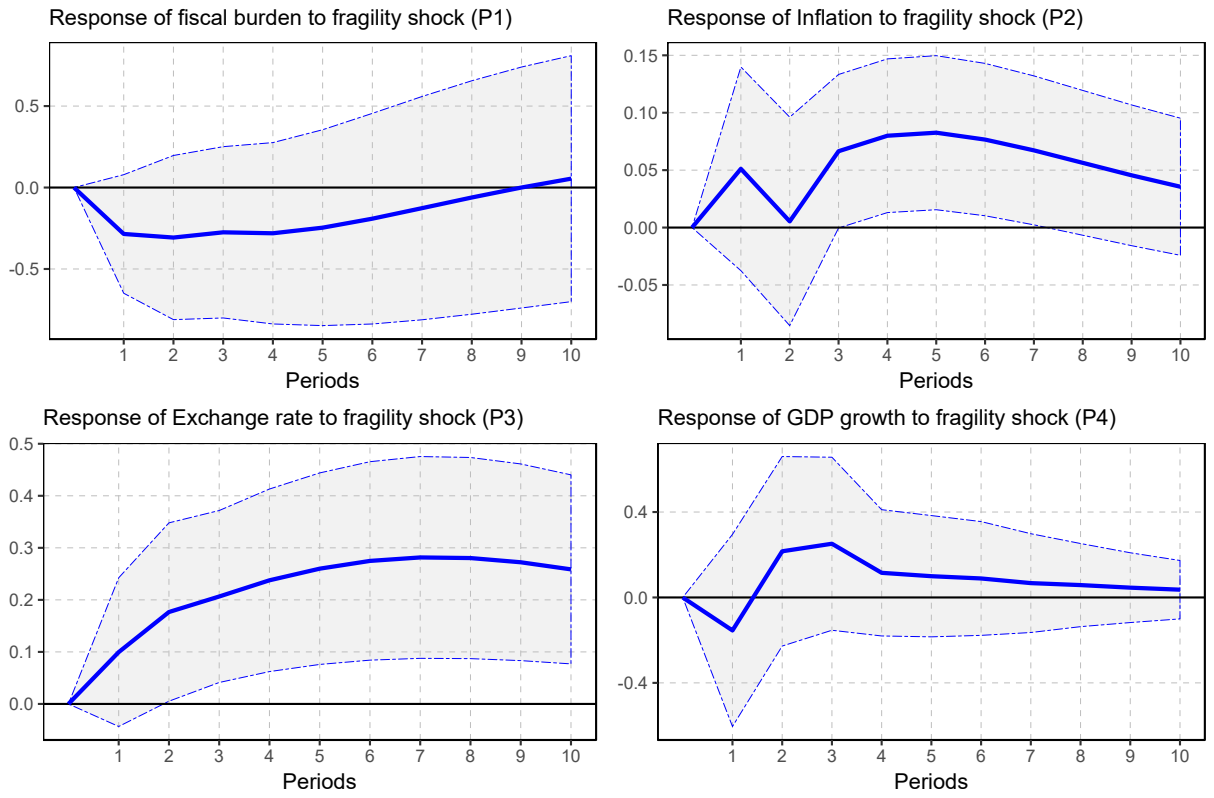
Finally, the investment channel, using foreign direct investment flows as a proxy for investment, and the global shocks channel, using changes in world GDP growth as a proxy, do not show evidence that either channel is a mediating mechanism for the effect of state fragility on macroeconomic outcomes. What we see from column 8 of Table 6, however, is that greater world GDP growth levels dampen macroeconomic volatility, but the interaction effects suggest that greater fragility with higher global growth rates lead to higher macroeconomic volatility, though the coefficients are not statistically significant at conventional levels. Overall, the results suggest that there are three plausible mechanisms for the transmission of the effects of state fragility to macroeconomic outcomes; the fiscal policy channel, the finance channel, and the aid channel. Therefore, domestic and international interventions in fragile states could be organised in such a way that they exploit these plausible mechanisms to achieve better macroeconomic outcomes for these countries.

5.4 Dynamic interactions and robustness

Until now, we have abstracted from potential feedback effects and dynamic interactions in our analysis of the relationship between state fragility and macroeconomic outcomes and policies. In this section, we relax that restriction and examine the simultaneous dynamic responses of these variables to sudden and unexpected changes in state fragility

and macroeconomic volatility. We also report robustness checks on the results from the baseline SGMM regressions by considering the sensitivity of the results to alternative estimation strategies, alternative measures of state fragility, and different sample periods.

Figure 4: Dynamic responses to state fragility shock



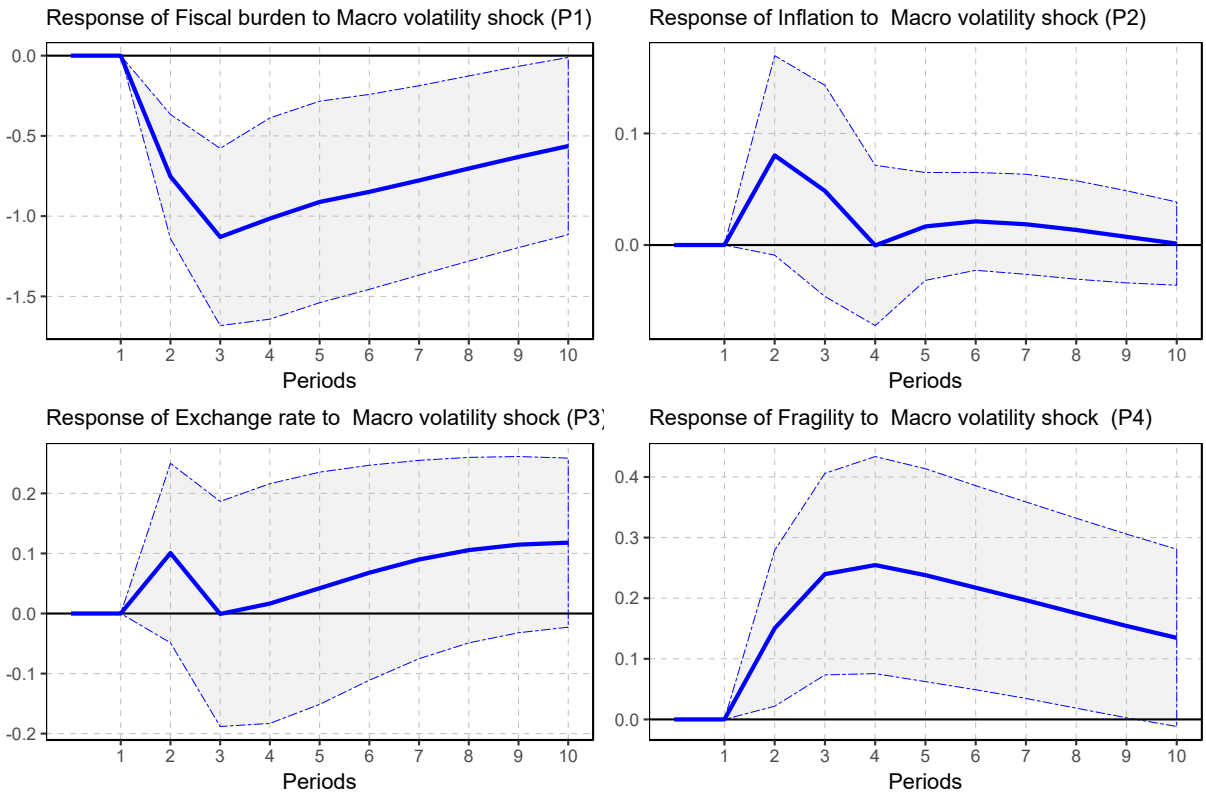
Note: Dynamic impulses are in response to a 5 points (one standard deviation) shock in the state fragility measure. The shaded bands represent 95 percent confidence intervals obtained after 399 Bootstrap simulations.

In Figure 4, we present the graphs of the impulse responses to a sudden and unexpected shock in state fragility from the estimation of Eq. (9), with two lags for each variable. The shaded bands represent 95 percent confidence intervals obtained after 399 Bootstrap simulations. The general pattern of the impulse responses, on impact, are consistent with the signs of the coefficients in the SGMM regressions of Table 2. In particular, the response of fiscal burden to a shock in state fragility is a downwards jump upon impact (see Panel 1 in Figure 4). This decline is rather persistent and only dies out after about 9 periods, indicating that state fragility leads to an immediate and sustained reduction in government size.

In Panel 2 of Figure 4, inflation increases on impact, stabilizes around the second period and then resumes the upward trend after the second period. The dynamic response of exchange rate to a state fragility shock (Panel 3) is rather explosive, as it jumps up on impact, and maintains a steady increase up till the tenth period. The response of GDP growth to a fragility shock is mild, falling modestly on impact and then stabilizing after the fourth period and beyond. Overall, the results show that the macroeconomic consequences

of a shock to state fragility is to decrease government size, increase inflation, increase exchange rate volatility and reduce growth. The quantitative effects are more severe and persistent on the measure of government size and exchange rate.

Figure 5: Dynamic responses to macroeconomic volatility shock



Note: Dynamic impulses are in response to a 5 points (one standard deviation) shock in macroeconomic volatility measures by the standard deviation of GDP per capita growth. The shaded bands represent 95 percent confidence intervals obtained after 399 bootstrap simulations.

In Figure 5, we plot the dynamic responses of the macroeconomic variables, including state fragility, to a shock in macroeconomic volatility. Panel 4 indicates that after a one period lag, the response of state fragility to a shock in macroeconomic volatility is a moderate positive increase in the level of state fragility. Hence, economic outcomes such as volatility, crisis, and performance, are a major driving factor into state fragility situations in Africa. Further, the results also show that after a lag of about one to two years, inflation and exchange rate respond to macroeconomic volatility positively while government balance responds negatively.

In Table 7, we report the results from the sensitivity and robustness checks on the baseline SGMM regression results. Our first concern is to check whether the baseline results are being driven by influential outliers, having noticed from the section on stylized facts that some countries appear to be outliers, with respect to some variables. To control for this problem, we estimate a Jackknife GMM regression, which simply implements a leave-one-out resampling of the countries. The results are in Column 1 of Table 7. The

results indicate that some influential outliers may be mildly affecting the results. However, given that the state fragility parameter is still marginally significant at the 10 percent level, this suggests that influential outliers in the data do not constitute a source of significant distortion to the results.

Table 7: Sensitivity and robustness checks

	Jackknife GMM	Security dim.	Political dim.	Social dim.	Ex. Constrain	Random effect	Pre 2000	Post 2000
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged volatility	-0.047	-0.057	-0.054	0.028	-0.029		0.083***	0.030
	(0.169)	(0.155)	(0.132)	(0.137)	(0.132)		(0.024)	(0.028)
State fragility	0.262*					0.319***	0.099	0.554***
	(0.159)					(0.114)	(0.092)	(0.141)
Security dimension		0.617*						
		(0.374)						
Political dimension			0.543					
			(0.420)					
Social dimension				0.625*				
				(0.366)				
Executive constraint					0.703***			
					(0.251)			
Controls								
Diversification	-0.079	-0.119	-0.112*	-0.035	-0.078	-0.053**	0.045***	0.012
	(0.082)	(0.086)	(0.064)	(0.065)	(0.081)	(0.023)	(0.009)	(0.020)
Aid	-1.385*	-1.441***	-0.884**	-0.751***	-0.897*	-0.186	1.119***	0.048
	(0.725)	(0.603)	(0.460)	(0.306)	(0.523)	(0.217)	(0.255)	(0.115)
Financial depth	0.058*	0.047*	0.051**	0.047*	0.044**	0.005	-0.023***	0.010***
	(0.036)	(0.029)	(0.024)	(0.028)	(0.023)	(0.008)	(0.009)	(0.003)
FDI	0.002	-0.112	-0.095	0.006	-0.025	-0.013	-0.080	0.007
	(0.175)	(0.098)	(0.088)	(0.151)	(0.095)	(0.048)	(0.060)	(0.028)
Inflation							0.001***	0.329**
							(0.000)	(0.146)
Constant	28.958**	35.563***	23.376**	15.131**	20.772*	8.379*	-20.434***	-1.664
	(13.151)	(12.548)	(10.091)	(7.226)	(13.112)	(4.531)	(5.220)	(3.337)
No. of observations	119	119	119	119	112	242	96	144
No. of SSA countries	42	42	42	42	40	40	35	39
No. of instruments	38	38	38	38	38		43	101
Hansen J test	32.85	31.83	34.05	29.23	31.18		28.65	28.13
p-value	0.38	0.43	0.32	0.56	0.46		0.77	1.00
Arellano-Bond AR(1) test	-1.61	-1.34	-1.45	-1.43	-1.24		-1.57	-2.16
p-value	0.11	0.18	0.15	0.15	0.21		0.12	0.03

The next issue we consider is related to the specific dimensions of state fragility that is most influential in driving its causal effects on macroeconomic outcomes. To answer this question, we use disaggregated data on three different dimensions of state fragility: the security, political, and social dimensions. The results in Columns 2 to 4 of Table 7 indicate that when state fragility is disaggregated, the standard errors of the estimates explode. However, even with this explosion, the coefficient on the security dimension and social dimension still manage to retain significance at the 10 percent level, while the political dimension completely loses statistical significance. This could be interpreted to mean that the security and social dimensions of state fragility are the main components that have causal effects on macroeconomic outcomes.

In Column 5 of Table 7, we use an alternative measure of state fragility, the constraint on the executive, a measure often used in the literature to gauge the quality of institutions (see Acemoglu et al., 2003; Acemoglu, 2010). When compared with the results from the baseline regression, apart from quantitative differences, mostly due to the different indexation scales used, the results are qualitatively the same. In Column 6, we report results from random effect estimation of the baseline model, again, the results are qualitatively similar to the results from the baseline regression.

Finally, in Columns 7 and 8 of Table 7, we report results for the investigation of the effects period specific events. In particular, we compare the results in the pre-2000 period, generally reckoned as the episode of abysmal macroeconomic performance in sub-Saharan Africa, with the results from the post-2000 episode. The comparison shows that there is a significant relationship between state fragility and macroeconomic performance in the post-2000 episode. This conclusion is not also the case for the pre-2000 episode. One possible interpretation is that during the 1990s, many fragile states in Africa did not experience much growth, and therefore there was no significant macroeconomic volatility during that period. These results highlight the point made by Acemoglu et al. (2003), that countries with weak institution, or fragile states in our context, may go through periods of high growth, but this growth is often accompanied by high volatility as seems to be the case in the post-2000 episode, and on the other hand, they may also experience long periods of low growth and by implication low volatility as seems to be the case in the pre-2000 episode. Overall, we conclude that our baseline results and the conclusions that arise from them survive well under different empirical models.

6 Concluding remarks

In this paper, we started by asking two main questions; how does state fragility affect macroeconomic outcomes, and what are the possible transmission mechanisms from state fragility to macroeconomic performance in sub-Saharan Africa? We endeavoured to answer these questions using stylized facts and carefully specified regression estimation equations.

In particular, we used cross-sectional regressions and internal instrumentation based panel system generalized method of moment estimators to better understand the relationship between state fragility and macroeconomic outcomes.

The results show that state fragility leads to higher macroeconomic volatility, greater severity in economic crisis, and lower macroeconomic performance. But state fragility is not traditionally regarded as the primary determinant of macroeconomic outcomes in mainstream macroeconomics. Rather, macroeconomic policies, in line with the Washington consensus, are often regarded as the primary determinants of macroeconomic outcomes. Our results show that both state fragility and macroeconomic policies play independent and non-trivial roles in the determination of macroeconomic outcomes in sub-Saharan African economies. Among the macroeconomic policy variables considered, the size of government seems to be a plausible mediating channel by which state fragility exerts indirect effects on macroeconomic outcomes.

In search of other plausible mechanisms for the transmission of state fragility effects to macroeconomic outcomes, we do not find sufficient evidence to support the role of the investment channel and the global shocks channel. What we find, however, is that state fragility exerts knock-on effects on macroeconomic volatility through the finance channel. Moreover, we also find that macroeconomic volatility caused by state fragility is partially and indirectly dampened through the aid channel.

For policy interventions, since the results of the study provide evidence that points to three main channels by which state fragility exerts knock-on effects on macroeconomic outcomes: fiscal policy, in terms of the size of government spending, the finance channel, and the aid channel. Therefore, domestic and international interventions in fragile states that would be effective and pragmatic should essentially be organised in such a way that they effectively exploit the potential for using these channels as macroeconomic instruments to improve macroeconomic outcomes and performance in sub-Saharan Africa. In summary, macroeconomic outcomes matter for state fragility and state fragility matters much more for macroeconomic outcomes.

Appendices

Table 8: Descriptive statistics by country for selected variables

	Fragility		Volatility		Crisis		GDPpc growth		GDP per capita		Fiscal burden		Inflation		Exchange rate vol		Diversification		Fin depth		Openness		FDI		Ex. Constraint	
Countries	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Angola	20.80	(.)	6.462	(.)	17.82	(.)	3.284	(.)	2211.5	(.)	27.13	(.)	145.7	(.)	46.74	(.)	24.59	(.)	0.658	(.)	137.2	(.)	16.80	(.)	5	(.)
Benin	13.50	(3.260)	1.426	(0.610)	3.384	(1.332)	4.556	(0.557)	708.3	(48.68)	14.26	(1.825)	3.708	(1.594)	548.4	(75.24)	46.88	(4.439)	11.56	(5.539)	57.50	(6.702)	1.099	(1.344)	3	(0)
Botswana	4.800	(1.766)	3.781	(1.987)	9.359	(4.631)	4.942	(1.652)	5591.7	(975.5)	22.14	(4.560)	8.215	(1.264)	5.760	(1.672)	53.33	(5.251)	-22.78	(29.43)	97.13	(9.097)	3.545	(1.483)	1.100	(0.200)
Burkina Faso	15.85	(0.915)	2.116	(0.139)	5.444	(0.515)	6.139	(1.059)	492.5	(92.93)	21.69	(0.785)	2.816	(1.586)	548.4	(75.24)	42.92	(1.898)	14.70	(4.637)	41.95	(11.96)	0.970	(0.910)	5.250	(0.500)
Burundi	20.40	(2.546)	2.605	(2.099)	6.042	(4.971)	1.816	(3.226)	218.0	(8.808)	21.28	(4.670)	12.49	(4.183)	961.5	(432.1)	38.72	(3.925)	23.51	(1.659)	36.01	(11.51)	0.251	(0.199)	3.625	(1.887)
Cameroon	5.300	(0.622)	0.625	(0.326)	1.512	(0.797)	4.041	(0.925)	1114.3	(75.27)	10.27	(1.040)	2.982	(1.215)	548.4	(75.24)	46.24	(0.916)	13.39	(3.074)	43.29	(2.939)	1.469	(0.574)	6	(0)
Cape Verde	16.30	(0.707)	3.557	(3.223)	9.682	(9.558)	4.581	(3.547)	3291.0	(267.3)	17.99	(0.684)	2.832	(1.076)	82.65	(0.382)	73.73	(1.066)	76.32	(8.224)	93.24	(5.522)	8.402	(2.854)	1	(0)
Central Afr. Rep.	18.10	(3.404)	7.071	(7.140)	16.65	(16.18)	0.344	(4.192)	417.9	(24.07)	10.69	(3.054)	3.426	(1.201)	548.4	(75.24)	32.01	(1.245)	18.42	(7.730)	39.33	(7.006)	1.467	(1.065)	4.300	(0.945)
Chad	21.05	(0.915)	6.840	(4.136)	18.07	(11.58)	7.332	(4.443)	694.5	(203.9)	6.625	(0.614)	3.694	(1.548)	548.4	(75.24)	39.36	(6.520)	8.109	(3.450)	74.62	(16.71)	6.873	(11.24)	6	(0)
Comoros	13.80	(2.030)	1.855	(1.775)	4.268	(4.067)	2.768	(1.093)	759.6	(14.58)	15.49	(1.817)	3.224	(1.200)	408.4	(68.77)	48.10	(1.916)	16.70	(7.443)	60.28	(13.47)	1.051	(0.787)	1.933	(1.617)
Congo, Dem. Rep.	23.25	(0.443)	2.661	(2.127)	6.369	(5.163)	2.989	(4.459)	308.0	(36.47)	8.126	(3.400)	129.2	(145.3)	440.3	(393.0)	39.45	(6.371)	3.283	(2.544)	58.84	(19.93)	1.589	(2.377)	5.950	(0.412)
Cote d'Ivoire	17.33	(2.194)	3.400	(2.589)	8.169	(6.160)	3.167	(3.392)	1316.3	(63.02)	13.27	(0.749)	3.421	(1.617)	567.9	(78.78)	53.49	(0.871)	23.41	(3.541)	80.96	(7.108)	1.925	(0.693)	3.667	(1.155)
Gabon	10.73	(0.115)	2.373	(1.587)	5.400	(3.439)	2.338	(3.065)	9764.9	(358.0)	14.08	(0.510)	2.023	(0.918)	544.4	(91.64)	34.90	(2.347)	12.13	(4.972)	86.70	(0.461)	3.279	(1.330)	5.200	(1.058)
Gambia, The	13.93	(0.416)	3.984	(0.765)	9.515	(1.860)	3.446	(0.852)	532.5	(5.467)	9.290	(0.972)	6.144	(2.538)	26.97	(6.089)	57.67	(2.089)	28.97	(15.26)	63.92	(5.026)	6.264	(2.431)	6	(0)
Ghana	12.60	(1.479)	1.646	(1.502)	4.338	(4.202)	5.910	(1.896)	1162.5	(270.0)	12.90	(2.904)	20.07	(9.373)	0.920	(0.613)	39.05	(8.838)	28.95	(4.549)	84.67	(13.83)	4.370	(2.950)	2.650	(1.050)
Guinea-Bissau	17.70	(0.622)	5.742	(6.773)	14.80	(17.02)	1.851	(1.926)	528.3	(46.36)	12.36	(3.390)	9.597	(13.77)	532	(78.83)	38.17	(5.879)	8.623	(3.604)	49.26	(4.037)	1.513	(0.761)	3.250	(1.038)
Kenya	13.50	(1.997)	1.958	(0.598)	4.739	(1.293)	4.023	(1.583)	920.4	(91.34)	15.48	(1.095)	9.165	(3.261)	73.73	(10.83)	52.14	(1.579)	38.00	(3.459)	55.63	(0.846)	0.544	(0.128)	2.700	(1.793)
Lesotho	11.70	(1.571)	1.682	(0.352)	4.175	(0.798)	3.810	(1.001)	922.3	(178.3)	35.88	(1.050)	7.453	(1.865)	7.225	(1.678)	53.46	(10.05)	-5.024	(8.601)	167.7	(17.68)	10.01	(13.51)	1	(0)
Madagascar	13.30	(1.669)	3.925	(3.582)	9.853	(9.258)	2.920	(0.763)	417.4	(9.781)	9.168	(1.204)	11.58	(4.545)	1639.8	(526.2)	56.90	(1.168)	13.93	(2.497)	65.36	(11.15)	4.370	(4.132)	2.700	(0.476)
Malawi	14.80	(0.632)	3.625	(1.726)	8.922	(3.999)	5.113	(2.338)	413.7	(47.77)	13.67	(1.881)	21.75	(13.16)	127.9	(104.4)	47.85	(4.107)	15.61	(4.967)	60.52	(5.958)	3.174	(2.987)	2.550	(0.640)
Mali	16.90	(1.510)	3.776	(3.389)	8.969	(7.980)	7.626	(2.506)	553.0	(172.5)	14.87	(1.522)	2.922	(1.715)	548.4	(75.24)	39.77	(0.958)	13.22	(1.868)	56.11	(1.981)	2.496	(0.703)	3	(0)
Mauritania	16	(0)	4.415	(5.120)	10.90	(12.75)	5.626	(0.725)	1233.4	(56.71)	21.41	(2.440)	5.969	(1.503)	275.2	(23.19)	35.73	(0.774)	37.51	(4.441)	111.4	(8.949)	12.49	(2.149)	5.500	(0.707)
Mauritius	1.550	(0.640)	1.637	(1.011)	3.983	(2.499)	4.251	(0.582)	6512.6	(1448.2)	13.96	(0.185)	5.639	(1.410)	27.51	(4.389)	65.53	(5.329)	92.34	(18.96)	121.4	(4.741)	2.195	(1.346)	1	(0)
Mozambique	16.30	(2.511)	3.710	(3.944)	9.974	(10.68)	8.596	(2.237)	334.0	(101.3)	17.83	(3.003)	12.70	(7.328)	22.08	(8.152)	52.02	(1.840)	12.65	(10.46)	72.93	(19.69)	10.76	(12.90)	3.900	(0.200)
Namibia	6.267	(1.301)	2.554	(1.838)	6.379	(4.924)	4.887	(0.939)	4741.2	(762.4)	22.97	(1.919)	5.872	(0.519)	8.022	(0.644)	58.90	(1.848)	48.82	(3.577)	99.17	(8.613)	2.493	(1.171)	3	(0)
Niger	17.90	(0.416)	3.719	(0.245)	9.827	(1.066)	4.493	(1.779)	344.7	(14.57)	14.28	(0.810)	2.731	(1.582)	548.4	(75.24)	44.51	(3.676)	9.968	(1.736)	50.43	(10.53)	4.482	(5.594)	3.600	(0.952)
Nigeria	19.10	(1.612)	4.486	(5.475)	10.89	(12.73)	6.434	(3.866)	1788.4	(536.5)	8.979	(1.851)	15.14	(6.995)	110.4	(51.88)	31.00	(13.89)	18.51	(2.098)	58.25	(12.26)	2.987	(1.189)	3.750	(1.500)
Rwanda	20.73	(1.858)	5.847	(4.822)	14.87	(11.63)	10.56	(4.419)	387.1	(84.85)	13.45	(2.579)	7.384	(2.745)	447.5	(129.6)	46.59	(6.908)	10.83	(2.447)	34.36	(4.341)	0.695	(0.780)	5.533	(0.503)
Senegal	12.00	(2.123)	1.704	(0.554)	4.056	(1.493)	4.051	(0.408)	926.2	(77.24)	13.87	(1.011)	1.985	(0.894)	548.4	(75.24)	58.79	(1.846)	24.96	(4.834)	68.27	(4.611)	2.063	(0.594)	3.150	(1.300)
Sierra Leone	21	(3.233)	6.220	(4.437)	15.70	(12.81)	5.449	(5.624)	415.0	(90.58)	10.55	(1.500)	11.17	(11.44)	2698.9	(1308.4)	29.42	(9.951)	29.65	(19.68)	51.88	(20.42)	5.505	(6.696)	3.100	(1.332)
South Africa	10.10	(2.194)	1.467	(1.078)	3.610	(2.533)	3.056	(0.629)	6758.6	(733.6)	19.12	(0.683)	6.233	(0.971)	7.225	(1.678)	65.69	(2.049)	166.0	(20.71)	55.60	(6.951)	1.606	(0.481)	1	(0)
Sudan	23	(0.632)	2.584	(0.797)	6.320	(1.970)	5.330	(2.943)	1217.4	(305.9)	9.876	(3.255)	25.37	(22.52)	2.550	(0.936)	42.94	(4.298)	14.57	(8.128)	30.65	(9.622)	3.449	(1.680)	6.125	(1.181)
Swaziland	8.550	(0.191)	0.797	(0.116)	1.981	(0.297)	2.575	(0.644)	2804.8	(185.5)	16.47	(1.921)	7.505	(0.913)	7.225	(1.678)	45.06	(2.294)	13.18	(3.463)	148.2	(27.40)	2.642	(1.037)	6.200	(0.400)
Tanzania	13	(2.355)	1.131	(0.466)	2.694	(1.029)	5.944	(1.276)	606.5	(126.2)	14.23	(2.618)	10.11	(4.983)	1095.5	(394.7)	44.94	(2.794)	13.05	(4.075)	45.53	(5.010)	3.763	(0.757)	5	(0)
Togo	15.30	(2.553)	2.769	(2.551)	7.025	(6.737)	3.592	(2.401)	509.6	(18.69)	10.99	(0.964)	3.525	(2.077)	548.4	(75.24)	44.63	(1.636)	25.05	(7.706)	89.80	(13.30)	3.817	(2.027)	5.750	(0.500)
Uganda	18.30	(1.822)	2.251	(0.480)	5.766	(0.981)	6.891	(1.340)	506.7	(112.5)	12.38	(2.408)	6.928	(2.915)	1811.5	(539.1)	48.38	(6.239)	10.19	(3.689)	41.35	(8.082)	3.757	(1.289)	5	(0)
Zambia	13.20	(.)	1.826	(.)	4.700	(.)	7.136	(.)	1554.5	(.)	2.804	(.)	7.260	(.)	5.272	(.)	54.92	(.)	22.37	(.)	76.08	(.)	6.714	(.)	3	(.)
Zimbabwe	16.87	(0.757)	6.583	(2.053)	17.76	(6.265)	-2.837	(5.177)	1010.0	(283.7)	14.74	(6.423)	2942.9	(4900.5)	31.63	(53.75)	53.01	(2.609)	62.98	(16.24)	77.94	(6.600)	1.286	(1.096)	5.533	(0.462)
Panel	14.76	(5.368)	3.199	(3.044)	8.004	(7.708)	4.445	(3.191)	1608.1	(2160.4)	14.71	(6.045)	77.89	(739.9)	480.7	(640.3)	46.76	(10.72)	24.57	(32.96)	69.79	(32.84)	3.551	(4.765)	3.824	(1.806)

Notes: SD is for the standard deviation of the variables which are reported in parenthesis.

References

Acemoglu, D. (2010). Institutions, factor prices and taxation: virtues of strong states? *American Economic Review: Papers and Proceedings*, *100*(2), 115–119.

Acemoglu, D., Johnson, S., Robinson, J., & Thaicharoen, Y. (2003). Institutional causes, macroeconomic symptoms: volatility, crises and growth. *Journal of Monetary Economics*, *50*(1), 49–123.

Acemoglu, D., Johnson, S., & Robinson, J. A. (2005). Institutions as a fundamental cause of long-run growth. *Handbook of Economic Growth*, *1*, 385–472.

Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica*, *60*(2), 323–351.

Aizenman, J., & Pinto, B. (2005). *Managing economic volatility and crises: A practitioner's guide*. Cambridge University Press.

Baltagi, B. (2008). *Econometric analysis of panel data*. John Wiley & Sons.

Barro, R. J. (1991). Economic growth in a cross section of countries. *The Quarterly Journal 0f Economics*, *106*(2), 407–443.

Barro, R. J., & Sala-i-Martin, X. (1992). Convergence. *Journal of Political Economy*, 223–251.

Beck, T., Lundberg, M., & Majnoni, G. (2001). Financial development and economic volatility: does finance dampen or magnify shocks. *World Bank Policy Research Working Paper*(2707).

Benhabib, J., & Rustichini, A. (1996). Social conflict and growth. *Journal of Economic Growth*, *1*(1), 125–142.

Besley, T., & Persson, T. (2010). State capacity, conflict, and development. *Econometrica*, *78*(1), 1–34.

Besley, T., & Persson, T. (2011). Fragile states and development policy. *Journal of the European Economic Association*, *9*(3), 371–398.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, *87*(1), 115–143.

Bussmann, M., Schneider, G., & Wiesehomeier, N. (2005). Foreign economic liberalization and peace: The case of sub-Saharan Africa. *European Journal of International Relations*, *11*(4), 551–579.

Caldara, D., Fuentes-Albero, C., Gilchrist, S., & Zakrajšek, E. (2016). The macroeconomic impact of financial and uncertainty shocks. *European Economic Review*.

Chauvet, L., & Collier, P. (2005). Policy turnarounds in failing states. *Centre for the Study of African Economies*.

Chauvet, L., & Collier, P. (2008). What are the preconditions for turnarounds in failing states? *Conflict Management and Peace Science*, *25*(4), 332–348.

Chauvet, L., Collier, P., & Hoeffler, A. (2010). Paradise lost: the costs of state failure in the pacific. *The Journal of Development Studies*, *46*(5), 961–980.

Chauvet, L., Collier, P., & Hoeffler, A. (2011). The cost of failing states and the limits to sovereignty. In *Fragile states: Causes, costs and responses* (pp. 91–110). Oxford University Press.

Collier, P. (2007). *The bottom billion: Why the poorest countries are failing and what can be done about it*. Oxford University Press, Washington.

Collier, P., Elliott, L., Hoeffler, A., Reynal-Querol, M., & Sambanis, N. (2003). *Breaking the conflict trap: Civil war and development policy*. The World Bank and Oxford University Press, Washington.

Collier, P., Hoeffler, A., & Söderbom, M. (2008). Post-conflict risks. *Journal of Peace Research*, *45*(4), 461–478.

Easterly, W. (2005). National policies and economic growth: a reappraisal. *Handbook of Economic Growth*, *1*, 1015–1059.

Easterly, W., Islam, R., & Stiglitz, J. E. (2001). Shaken and stirred: explaining growth volatility. In *Annual World Bank Conference on Development Economics* (Vol. 191, p. 211).

Easterly, W., & Levine, R. (1997). Africa's growth tragedy: policies and ethnic divisions. *The Quarterly Journal of Economics*, 1203–1250.

Easterly, W., Levine, R., & Roodman, D. (2003). *New data, new doubts: A comment on burnside and dollar's" aid, policies, and growth"(2000)* (Tech. Rep.). National Bureau of Economic Research.

Enders, W. (2015). *Applied time series econometrics* (Vol. 52183919). John Wiley and Sons. ISBN X.

European Report. (2009). *Overcoming Fragility in Africa: Forging a New European Approach*. San Domenico di Fiesole: Robert Schuman Centre for Advanced Studies, European University Institute. Retrieved from https://ec.europa.eu/europeaid/sites/devco/files/report-development-overcoming-fragility-africa-2009_en_5.pdf

Hansen, H., & Tarp, F. (2001). Aid and growth regressions. *Journal of Development Economics*, *64*(2), 547–570.

Iqbal, Z., & Starr, H. (2008). Bad neighbors: Failed states and their consequences. *Conflict Management and Peace Science*, *25*(4), 315–331.

Jones, S., & Tarp, F. (2016). Does foreign aid harm political institutions? *Journal of Development Economics*, *118*, 266–281.

Klomp, J., & de Haan, J. (2009). Political institutions and economic volatility. *European Journal of Political Economy*, *25*(3), 311–326.

Lensink, R., & Morrissey, O. (2000). Aid instability as a measure of uncertainty and the positive impact of aid on growth. *The Journal of Development Studies*, *36*(3), 31–49.

Lensink, R., & White, H. (2000). Assessing aid: A manifesto for aid in the 21st century? *Oxford Development Studies*, *28*(1), 5–18.

Loayza, N. V., Ranciere, R., Servén, L., & Ventura, J. (2007). Macroeconomic volatility and welfare in developing countries: An introduction. *The World Bank Economic Review*, *21*(3), 343–357.

Love, I., & Zicchino, L. (2006). Financial development and dynamic investment behavior: Evidence from panel VAR. *The Quarterly Review of Economics and Finance*, *46*(2), 190–210.

Lujala, P. (2010). The spoils of nature: Armed civil conflict and rebel access to natural resources. *Journal of Peace Research*, *47*(1), 15–28.

Lujala, P., Gleditsch, N. P., & Gilmore, E. (2005). A diamond curse? civil war and a lootable resource. *Journal of Conflict Resolution*, *49*(4), 538–562.

Marshall, M. G., & Cole, B. R. (2014). State Fragility Index and Matrix 2014. *Center for Systemic Peace*.

Mobarak, A. M. (2005). Democracy, volatility, and economic development. *Review of Economics and Statistics*, *87*(2), 348–361.

Naudé, W., Santos-Paulino, A. U., & McGillivray, M. (2011). *Fragile states: causes, costs, and responses*. Oxford University Press.

Newey, W. K., & Windmeijer, F. (2009). Generalized method of moments with many weak

moment conditions. *Econometrica*, *77*(3), 687–719.

OECD. (2013). *Ensuring fragile states are not left behind: 2013 Factsheet on resource flows and trends*. OECD-DAC. Retrieved from http://www.oecd.org/dac/governance-peace/conflictfragilityandresilience/docs/factsheet%202013%20resource%20flows%20final.pdf

Rodrik, D. (2006). Goodbye Washington consensus, hello Washington confusion? A review of the World Bank's economic growth in the 1990s: learning from a decade of reform. *Journal of Economic literature*, *44*(4), 973–987.

Romer, P. M. (1986). Increasing returns and long-run growth. *The Journal of Political Economy*, 1002–1037.

Romer, P. M. (1990). Are nonconvexities important for understanding growth? *The American Economic Review*, *80*(2), 97–103.

Sachs, J. D., & Warner, A. M. (1997). Sources of slow growth in African economies. *Journal of African economies*, *6*(3), 335–376.

Sala-i Martin, X. (1994). Cross-sectional regressions and the empirics of economic growth. *European Economic Review*, *38*(3-4), 739–747.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 65–94.

Stewart, F., & Brown, G. (2009). Fragile states. *CRISE (Department of International Development, University of Oxford)*.

Stiglitz, J. E. (2005). More instruments and broader goals: moving toward the Post-Washington consensus. In *WIDER Perspectives on Global Development* (pp. 16–48). Springer.

Williamson, J. (2000). What should the world bank think about the washington consensus? *The World Bank Research Observer*, *15*(2), 251–264.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step gmm estimators. *Journal of Econometrics*, *126*(1), 25–51.

Wolf, H. (2005). Volatility: definitions and consequences. In J. Aizenman & B. Pinto (Eds.), *Managing economic volatility and crises: A practitioner's guide* (chap. 1). Cambridge, Cambridge University Press.