Macro-financial and geopolitical analysis of African equity capital markets

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Declaration

I, Richard Odumodu, hereby declare that this thesis is my own original work. Where information has been derived from other sources or specific reference is made to the work of others, I confirm that this has been indicated and acknowledged in the thesis. The content of this thesis has not been submitted, in whole or in part, for consideration for any other degree or qualification at this or any other university

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London, 24 June 2024

Richard J Odumodu

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Abbreviations and Acronyms

ACM	African capital markets
AE	Advanced Economy
ACFTA	African Continental Free trade Agreement
AMU	Arab Maghreb Union
AU	African Union
BCEAO	Banque Centrale des Ètats de l'Afrique de l'Ouest
BIS	Bank of International Settlements
BOE	Bank of England
BRI	Belt and Road Initiative
BRICS	Brazil, Russia, India, China and South Africa
CEMAC	Central African Economic and Monetary Community
CEN-SAD	Community of Sahel- Saharan States
CFA	Communauté Financière d'Afrique
CFM	capital flow measure
CMA	Common Monetary Area
COMESA	Common Market for Eastern and Southern Africa
DM	Developed Market
DSA	Debt Sustainability Analysis
DSSI	Debt Service Suspension Initiative
EA	East Africa
ECB	European Central Bank
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
EM	Emerging Market
EFM	emerging and frontier markets
EMDE	emerging markets and developing economies
EME	emerging market economy
ERS	Exchange Rate Stability
ESDC	European Sovereign Debt Crisis
FX	foreign exchange
FED	Federal Reserve
GFC	Global Financial Crisis
GFCy	Global Financial Cycle
GLR	Great Lockdown Recession
GM	Great Moderation
GR	Great Recession
ICT	Information and Communications Technology
IMF	International Monetary Fund
IT	Inflation Targeting
LIC	lower income country
MDE	More Diversified Economies
MENA	Middle East and North Africa
MI	Monetary Independence
MIC	middle income country

MINT	Mexico, Indonesia, Nigeria and Turkey
NFWA	North and French West Africa
PBOC	Peoples Bank of China
QE	Quantitative Easing
QT	Quantitative Tightening
REC	Regional Economic Community
ROE	Resource and Oil Exporting Economies
SADC	Southern Africa Development Community
SACU	Southern Africa Customs Union
SOA	Southern Africa
SSA	Sub Saharan Africa
TT	Taper Tantrum
UMI	upper middle income country
UMP	unconventional monetary policy
WA	West Africa
WAEMU	West Africa Economic and Monetary Union (*en fr* UEMOA)
WAMZ	West African Monetary Zone

Abstract

Over three chapters, this thesis pursues a research agenda that seeks to reconcile global risk appetite and perceptions rooted in narratives, with respect to Africa capital markets more broadly, and a global landscape defined by economic and financial shocks derived of, or determined by, geopolitical rivalries or alignments.

Our research effort seeks evidence of resilience, specifically in public equity capital markets in Africa, to identify patterns of its evolution that could be critical to future development. We collect an array of macroeconomic and financial market time series monthly data to build an eleven-country panel. We use standard econometric tools to perform rigorous empirical analysis on a combination of structural (push and pull) factors to consider key events and scenarios over a 13 year sample period. Our empirical analysis incorporates assessing individual capital markets, Africa as an economic bloc and various regional configurations.

We consider market resilience in the context of the transmission of policy, namely conventional and unconventional international monetary policy and global risk appetite through the Global Financial Cycle (GFCy). For external influence, beyond the US dollar dominant GFCy, we innovate to consider an initial 4 variations, kGFCy, represented by 3 other key centre economies (CHN, EU, UK). We also consider market resilience in the context of the transmission of shocks. For internal influence our innovation was initially constructing 3 geoeconomic zones from the country sample, representing regional ecosystem dynamics (ECO, ESA, RND).

In *Decomposing the influence of the GFCy on local equity index performance in Africa* we are able to reject the strongest form of our null hypothesis that African capital markets are sui generis. We develop a panel regression (pReg) model to estimate the influence of the k/GFCy, determine its effects over time, specifically before and after the GFC, using a set of grey rhino variables related to 2 of 3 policy objectives of the standard open economy trilemma, monetary independence (MI) and exchange stability (ERS). We find the GFCy (US) and one kGFCy variant (EU) are statistically significant influences and established a clearly different linear relationship pre- and post-GFC for the panel. We also find asymmetric integration to be a key driver of the heterogeneity evident in African equity capital markets. Structural break analysis highlights the importance of the exchange rate channel. Market size is a mediating factor in both cases.

In *Analysing the geopolitical economy of public equity market behaviour in Africa* we link to the previous chapter and continue to exploit the same data set with different tools to focus on the dynamics of responses. We use a series of panel vector autoregression (pVAR) GMM style estimations to analyse the interaction of a set of time invariant and time varying structural features of African economies and the behaviour of public equity markets. We construct 3 regional geoeconomic zones to help identify patterns. Through systematic tracking of forecasted response functions of local stock index variables to key economic bloc impulse variables, we find unexpected results about the relative influences of the US and China on African risk asset prices, but confirmatory results about the dominance of South Africa and the importance of market size.

A proposal for capital market development in Africa: A geoeconomic solution to a macro-financial trilemma is structured as a white paper, given its applied nature. Our contribution in this chapter is a policy proposal to grow the supply and increase demand for African risk assets and on a regional basis. We present the proposal as the result of an integrated theory model we introduce, synthesising inferences from previous chapters, supplemented by nascent frameworks of geoeconomics, in the context of an evolving global macrofinancial system. We explore the implausibility of a de novo institution and the possibilities of monetary innovation before settling on the more probable but optimal solution, for which we offer a set of three recommendations we discuss and critique.

Chapter I: *Decomposing the influence of the GFCy on local equity index performance in Africa*

'a rising tide lifts all boats'

- fishermen's expression that entered the political lexicon after a 1963 speech by JFK -

1.1 Introduction

There is a seam of the financial globalisation literature, following the global financial crisis (GFC), that explores the concept of a potent, but unobservable, global financial cycle (GFCy) composed of global risk appetite and global liquidity. A significant vein of that seam (Rey 2013 and 2016, Passari and Rey 2015 and Miranda Agrippino and Rey 2016) provides compelling evidence identifying the presence of the GFCy in capital flows, leverage and asset prices. A high degree of co-movement in global risky asset returns was estimated with a very large panel[1] and a dynamic factor model. It used a set of regional factors and identified a common global factor driving the co-movement in returns. The evidence of the strength of the transmission channel of US monetary policy to cross borders and influence risk premia it raises questions on the extent of the reach.

Though subject to some other critical constraining assumptions, this influence can be attributed to a hegemonic role played by the US in the global economy, which includes the role of the US dollar as the primary global reserve currency. Recent critical macro finance literature (Gabor 2020) also recognises the dominant role of the US in shaping the structural evolution of the architecture of global finance. Another vein of the financial globalisation literature (Aizenman, Chinn and Ito 2008, 2010, 2016 and Aizenman and Ito 2012) developed a centre-periphery methodology to explore the global financial architecture. Not only does it allow for tracing policy convergence over time but offers empirical analysis describing how emerging market policy 'experimentation' with liberalisation, over the sample period[2], exposed them to unintended consequences of increased financial integration.

There is, however, a contrast between the broader conclusions on international finance and monetary policy spillovers drawn by Rey et al for open economies and the narrower conclusions drawn by Aizenman et al for emerging economies. If the pursuit of exchange rate stability and financial openness by a periphery country makes it more likely to strengthen links to the monetary policies of a centre country, how might this apply to Africa specifically?

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[1] over a sample period straddling this century and the last (1990-2012)

[2] over a similar sample period but starting earlier (1986-2012)

There is also a heuristic approach to global capital asset allocation that applies to African economies and its capital markets, that considers them *sui generis*, that is of a particular type, within emerging and developing economies. The accompanying asymmetric narrative holds that where the archetypal capital market of an emerging or developing economy (EMDE) is smaller, shallower and less liquid relative to a developed market, African capital markets are perceived as more so. The heuristic may be rooted in a historical perspective of the previous century that may no longer be valid for both endogenous and exogenous reasons, in the context of more recent history during this century. The period prior to and following the global financial crisis (GFC) offers a structural point of reference to consider the consequences of financial globalisation, as it has evolved.

Investors in tradeable assets in emerging and frontier markets (EFM) have historically been attracted by exposure to the rapid growth dynamics of the underlying economies. Accessing cash flows generated by higher nominal growth rates, through the addition of EFM assets to a portfolio, can offer the benefits of diversification, through geography and the potential of lower correlation to developed market (DM) assets. However, the offer of higher returns is tempered with the risk of higher volatility. But, especially generalised in the case of African economies, and those in Sub Saharan Africa in particular, there is an additional issue of possibly high(er) correlations to, and dependency on, commodity prices.

The institutional setting in EMDEs typically creates higher frictions in domestic markets resulting in both a perception of higher risk and actual high(er) transaction costs. Due to lower levels of economic and capital market development, financial institutions are seen as weak(er), monetary institutions are deemed less credible and forecasting policy outcomes are therefore subject to more uncertainty. Because this perception grows stronger the further a country is in the periphery of global capital markets, the implied expectation for asset price behaviour at the frontier of global capital markets has displayed an asymmetrically negative bias.

However, the composition of the asset price panels used to estimate the common global factor driving risk appetite referenced above had an absence, notable for our purposes. Despite including series of asset prices series derived from emerging markets from regions including Latin America and Asia, global commodity prices and corporate bonds, asset prices from African were not represented. This is a feature reflected in the broader literature of global studies, to varying extents, we seek to remedy with our contribution.

In this paper, our goal is to identify, compare and contrast the relationships between financial market prices of risk assets in Africa, specifically equity listed on selected domestic public capital markets on the continent, and global push factors. We focus on the risk-taking channel of transmission of conventional and unconventional international monetary policy and economic and

financial conditions through time. We use two adjacent hypotheses that have been influenced by two analytical framework trilemmas to allow us to add layers to the resilience we seek to identify in and within African capital markets. The standard trilemma[3] of Mundell, aka the impossible trinity provides a set of grey rhinos variables derived from analysis of the macroeconomy. The empirical evidence from emerging market economies - a string of sudden stops of capital (inflows), capital flight (outflows), deleveraging crises, and episodic depletion of international reserves - offers clear and specific lessons (grey rhinos) for African in a capital market context of the unintended consequences of financial integration. On the other hand, the augmented trilemma[4] of Rodrik, aka the paradox of globalisation offers an alternative analysis rooted in political economy considerations. From both we derive some geoeconomic[5] conclusions.

However, both rely on the relationship between asset price volatility and growth volatility operating as a function of monetary and financial institutions. We assume channel of transmission for risk-taking begins in developed markets and moves outward to the periphery of emerging and frontier markets. Therefore, the effects or impact will thus be subject to lags, length and variability notwithstanding, from which we can infer elements of resilience.[6]

However, we also assume that the relationship between fundamental macroeconomic factors and financial market asset price performance may diverge the further into the periphery a country is (or is perceived to be). Additionally, a significant perceived risk is that real economy and financial cycle fluctuations in emerging and frontier markets are likely to exhibit more volatility with expectations of larger, sharper declines and slower recoveries. Thus estimating the impact of the GFCy on emerging and frontier markets could be subject to variant perceptions.

If we also consider that it may only be beyond an economic development threshold that public capital markets materially impact economic growth, the causality might be reversed at a certain level of financial market development. But while African economies remain at the frontier of the global capital markets, the influence of key countries, in addition to the US, may also vary meaningfully across the continent. [And] despite different challenges with economic diversification, the historical prevalence of bank-based financial systems across Africa is an important feature.

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[3] The challenge of achieving full monetary autonomy while maintain a fixed exchange rate and full capital mobility

[4] The challenge of offering mass politics while remaining a nation-state but in a world with increasingly integrated national economies

[5] Geoeconomics has material differences with economic geography, when defined as the use of economic instruments to achieve geopolitical objectives

[6] Our starting definition of resilience is similar to the 2019 BIS Committee on the Global Financial System Working Group report (Establishing viable capital markets, CGFS No.62) reference to measuring market resilience as the height and duration of spikes in (annualised) volatility in asset prices – equity prices and local currency government bond yields.

We contrast this feature with insights from emergent literature in critical macro finance (Gabor 2020) stressing the structural evolution of financial globalisation, as led by the US, has been based on market-based financial systems. The balance in favour of bank-based over market-based finance provision in individual African countries, more similar to Europe, has also been shaped as much as by capital requirements of dominant industries as by critical differences in policy choices and political landscapes. But there is sufficient high level data[7] to support the notion that the most acute gap in liquid asset creation capacity in Africa is in listed equities.

The enduring goal of capital market development in emerging and frontier markets has been to support the real economy by improving the access, cost and allocation of capital. Concurrently, structural transformation of individual economies in Africa beyond commodity and export-led models has been a policy focus over the past two decades. Differing narratives can highlight differing approaches to industrial policy strategy ; whether the focus is on manufacturing ('Factory Africa'), technology and services ('Silicon Savanah/Lagoon') or agriculture ('World's Grocery Store' a logical next question is how this is represented in the composition of the capital markets.

To that end, we explore the impact of the economic composition – between resource and oil exporting and more diversified economies - relative to the often mismatched composition of local stock exchange indexes – with banks, brewers and construction the short hand description of traditionally overrepresented sectors - in our underlying sample of African capital markets and regional-country variation in institutional dynamics and structural factors.

This will allow us to identify and measure the aggregate and individual sensitivity of those price series to various sources of exogeneity. We give ourselves scope consider a number of scenarios. The alternative sources of exogeneity, in addition to GFCy, are variants originating from three key economies (kGFCy). The scenarios, in a multipolar geoeconomic framework, include the following ; Africa being caught in the wake of a Thucydides' Trap unfolding between the two largest economies (US and China), and/or amid a Great Power competition for influence that includes the next largest economy (the Euro Area/EU) or perhaps with respect to a preeminent global financial centre (UK) currently challenged with reframing its own global position, but which has maintained a historical relationship with the continent, including as a hub for capital, versus a regional dimension of Near Peer competition between various regional hubs for capital on the continent.

The remainder of this paper proceed as follows; in section 2, we present a stylised model and context. In section 3 we discuss the integration of core theories and complete a targeted review of relevant thematic and empirical literature. In section 4 we describe our data and the

[7] Only about 1.5% of the world's equity market capitalisation is domestically listed in Africa, with more than 75% in 3 markets. Equity issuance (IPO and follow on offerings) activity in the past decade exhibits a similarly skewed distribution

empirical strategies we use to further develop our model. In section 5, we discuss initial results and findings towards drawing conclusions In the final section, we summarise our conclusions and discuss links to the complementary research questions and policy suggestions we continue to explore in subsequent chapters.

1.2 Stylised Model and Adjacent Hypotheses

1.2.1 Introduction of stylised model as the basis of adjacent hypotheses

The stylised model starts with the intuition behind the specification in Passari and Rey (2015). It relies on the premise that as global risk sentiment and global liquidity conditions change our expectations of their influence on the price of risky assets can change subject to domestic and regional factors, notwithstanding the global factor common to all risky assets. Though the method used by Miranda Agrippino and Rey (2012) to identify and extract a global factor common to all risk(y) assets used component analysis on a large sample of global financial price series (including commodities and corporate bonds in addition to equity prices), local stock index prices from Africa did not form a material portion of the sample. Our stylised model therefore simplifies the two steps below as an expectation of changes in a local stock index to be a function in changes in the global financial cycle.

$$if\ \mathbb{E}(\Delta\ asset\ prices)\ \int(\Delta\ risk\ sentiment,\ liquidity)\ can\ be\ expressed\ as\ \ \mathbb{E}(\Delta lsi)\ \int(\Delta\ GFCy)$$

However, it is the strength of the GFCy emanating to the periphery of the international financial and economic system that is of primary interest. Whether the strength of the GFCy is then a function of that 'distance' between the periphery and the centre of the global economy and subject to just push factors or is determined by pull and structural factors influenced by policy measures and institutional dynamics over time, or a combination informs the structure of our base model.

We can assume a linear relationship in the form of a first difference equation, where changes in a volatility index (VI) and the effective liquidity rate (LR), as proxies for the GFCy, explain a meaningful portion of the return on risk assets (Δy_t);

$$\Delta y_t = \alpha + \beta \Delta VI_t + \theta \Delta LR_t + \varepsilon_t \quad [1.1]$$

Then, to capture the effects of differing policy outcomes and institutional regimes and responses, we expand to control for the effects of local/country (X) and global [key] (Y) growth [economic activity] with a one period lag;

$$\Delta y_t = \alpha + \beta \Delta VI_t + \theta \Delta LR_t + \lambda \Delta X_{t-1} + \kappa \Delta Y_{t-1} + \varepsilon_t \quad [1.2]$$

Our primary hypothesis considers as the standard case, a simple portfolio allocation view of equity prices in Africa as sui generis, with the typical characteristics of underdeveloped capital markets in emerging and frontier markets; smaller size, shallow depth, inefficient and lacking liquidity, with relatively weaker institutions and higher frictions but also possibly with high(er) correlations to commodity prices and likely with low(er) integration (openness) levels with respect to financial globalisation. We state the null hypothesis formally below:

H1: African equity capital markets exhibit predictable homogeneity and lack resiliency

While the hegemonic influence of US financial markets and US monetary policy on global capital markets and the monetary conditions and financial stability in four open economies[8] was a focus in Rey (2016), our focus is on the impact on asset prices in Africa, over time with a particular focus on difference before and after the GFC. We also seek to build on another idea explored in Rey (2016), the existence of an international risk- taking channel of monetary policy transmission that might be more potent for particular currencies due to 'special' roles held in international financial markets. To that end, we aim to measure the impact of alternates sources of exogeneity on our sample African capital markets. Specifically, our adjacent hypothesis seeks to test whether heterogenous variation at the country-regional level can be identified through variants of GFCy originating from one of four key economies (kGFCy) we determine has highly and specifically relevant to our representative sample of African capital markets. We state the null hypothesis formally below:

H2: African equity capital market resiliency to the k/GFCy remained fixed through the GFC

The framing of these adjacent hypotheses allow us to investigate, in the context of a US dollar dominated global economy and the perception of investors, the influence of the economic composition underlying the representative sample of African capital markets, the relative influence of the composition of local stock exchange index(es) from which we generate the asset price series and regional-country variation in institutional dynamics and structural factors.

1.2.2 Competing views of financial globalisation and emerging and frontier markets and developing economies

As context for competing views of financial globalisation, we must first describe key distinctions between Emerging Markets and Developing Economies (EMDEs) and Emerging and

[8] Canada, Sweden, New Zealand and the UK

Frontier Markets (EFMs). These distinctions, from Advanced Economies (AEs) and Developed Markets (DM) can be presented as a contrast between the economic fundamentals, through levels of development or time, or via differences in market structure or by asset classes.

For instance, the origin of emerging markets as a definition and narrative can be traced back c.42 years ago to an IFC (part of the World Bank) employee's initiative to enhance the perception about equity markets so-called "third world" countries and economies and attract institutional investment and capital flows into a specific opportunity set. MSCI introduced the first EM Index in 1988 and has been classifying Emerging and Developed markets since then. Emerging Market Debt (EMD) earned a degree of notoriety in the 1980s and 1990s alongside various crises and specialist investor experiences.

Nevertheless, global organisations like the Organisation for Economic Cooperation and Development (OECD), the International Monetary Fund (IMF) and the Bank of International Settlements (BIS) offer various categorisations of countries and economies that still provide the standard starting point of country-level classifications. While at present the OECD has 38 full members, often described as (a club of) the richest economies, at the start of the century it only had 30, with 8 acceding to membership since 2010.

However, the approach in the literature to economy groups that was followed in an Abiad et al (2015) IMF working paper scrutinising rising economic resilience across time (60 year period) and regions (N=141) defined Advanced Economies (AEs) by OECD membership prior to 1990. This resulted in 21 countries classified as AEs. The remaining 120 countries are classified as Emerging Markets and Developing Economies (EMDEs). Within the EMDEs group are two further groups, 69 Emerging Markets (EMs) and 51 Low Income Countries (LICs). LICs were broadly defined as those eligible for concessional IMF loans with the remainder then classified as EMs. While noting subsequent analysis that was performed on these groups focused, in line with economic development literature, on GDP per capita as the chief variable of interest, for our purposes it is notable that there are no African AEs. With all (included) African countries (N=41) classified as EMDEs, we then note that only nine are classified as EMs, five in North Africa, though grouped the Middle East and North Africa region (MENA), and five in Sub Saharan Africa (SSA). Of the remaining 32 African LICs, 30 are in SSA.

Index providers offer alternative classifications of economies, but with an inherent focus on financial market development in practice. And though there are specific distinctions made by index providers between asset classes (ie bonds and equites), there are some commonalities regarding quantifiable features like size and liquidity thresholds. In the bond asset class there are further distinctions between sovereign bonds more diversified corporate issuers but most relevant in the

EMDE context is the distinction between bonds issued by governments in their local currency and those issued by governments and others in US Dollars (USD).

As JP Morgan is the generally agreed benchmark index provider in the EM bond markets, their criteria to determine index entry and exit offers a guide to index construction and composition. Eligibility is typically determined by a combination of three year trends of GNI per capita below an income ceiling or purchasing power parity ratio below a threshold and sovereign credit ratings below a threshold (A3/A-/A-). However, the key eligibility criteria is a threshold of the amount of issuance outstanding, with the minimum threshold (benchmark size), requiring issues to be at least $500 million for consideration. Notably, within the JPM EMBI index, designed to track performance of EM bonds issued in USD, only 15 African countries were in the Global Diversified portfolio (13% as of April 2018).

There are some notable exclusions from a purely economic performance perspective like Botswana and Mauritius. However, for the JPM GBI-EM index, designed to track the performance of EM bonds issued in local currency, there are important additional criteria to note. First, countries with explicit capital controls, or where constraints on holding bonds or buying or selling foreign exchange are imposed on foreign investors, are excluded. Second, in addition to the $500 million benchmark size requirement for global issues, local currency issuance must have a current face value amount outstanding of $1 billion or more. As a result, in the Global Core portfolio the only representative of Africa is South Africa (as of April 2018). In the equity asset class MSCI remains similar standard bearer of index provision. The MSCI methodology has three elements; economic development, size and liquidity of markets and foreign investor access.

1.2.2.1 Historical and current perspectives on EFM and of Africa

We begin by remarking on a long macro financial historical journey to a relevant investment perspective on Africa from more than a century ago, during a differing geo-economic regime when the UK was the global hegemon. The period in question includes part of what has now been described as the third Kondratieff wave, but is also when the first wave of financial globalisation may have begun. A micro-study of the Foreign & Commonwealth Investment Trust (FCIT) conducted by Chambers and Esteves (2014) from 1880 to 1913[9] provides valuable historical insight into a number areas relevant to the period we have selected for our study of African capital markets, not least given the parallel pre-pandemic timing.

[9] They draw on work by O'Rourke and Williamson (1999), 'When did globalisation begin?' which takes a historical approach focussed on commodity trade as a means of testing for the start of the globalisation process. Financial globalisation, however is somewhat distinct concept, terminology that owes its creation to Obstfeld and Taylor (2004)

With sterling as the global reserve currency, London had developed the pre-eminent global stock market by pioneering the adoption of arms-length capital markets which facilitated investment intermediation adjunct to wider financial intermediation. Prevailing expectations towards risk and return in (what would come to be known as) emerging markets drove the financial innovation behind the form of the FCIT,[10] but it maintained emerging market exposure throughout a period where two significant financial crises (1890-93, 1907) occurred without evidence of contagion. The prevailing liquidity preference led to a concentration in fixed income securities, as bonds were then deemed more attractive on a risk adjusted basis and far more liquid than 'ordinary shares' (equites/stocks). But finally, the evolution of risk appetite is evident in changes to specific regional allocation weightings during the period; between 1880 and 1910 the allocation, at prevailing market values, to the 'British Empire' fell from 15.2% to 3.3%, while the allocation to Africa fell from 8.9% to 0.7%.[11] However now, over century later, as illustrated in figures 1.1 and 1.2 below, we estimate only about 1.5% of the world's total domestically listed equity market capitalisation of $79 trillion in 2017 was listed in Africa. As a percentage of GDP, equity market capitalisation in Africa in 2017 was 85%, which dwarfs the government bond market capitalisation of 13%, but that, in turn, is ten times the corporate bond market capitalisation of 1.3%.

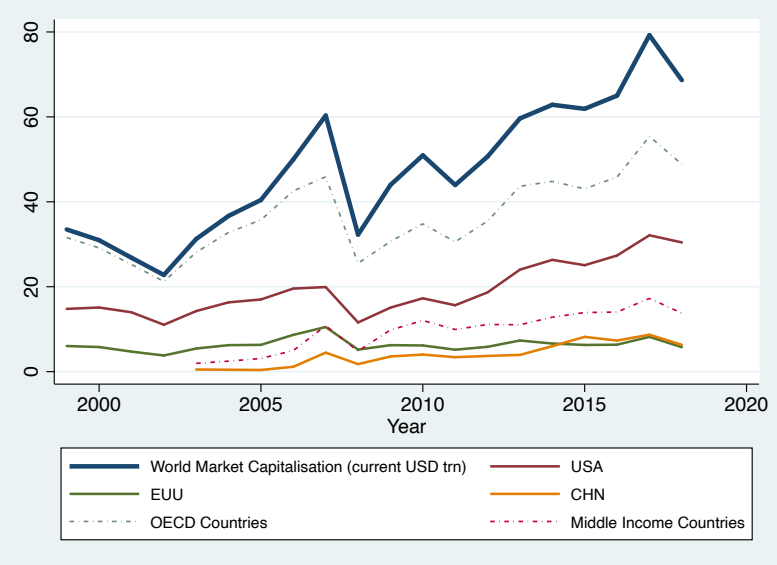


Fig. 1.1: Market Capitalisation (USD, trn) , 1999-2018

Note: This figure plots market capitalisation in USD of the world and key centre economies (US, EU, China) in comparison to (advanced) OECD and (developing) Middle Income countries from 1999 to 2018. Author's estimates using World Federation of Exchanges annual data

[10] Chambers and Esteves note how the Foreign & Colonial Investment Trust was both a leading and representative 'investment trust', a closed end mutual fund. It was designed as providing an opportunity for the "average investor' that as a patient investor pursued a buy and hold strategy. It did not engage in high(er) frequency trading and had lower turnover in comparison to modern institutional investors. They also describe FCIT as the first global emerging market investor.

[11] During the period of investigation FCIT invested in 882 different securities, sold by 446 different issuers in 46 countries

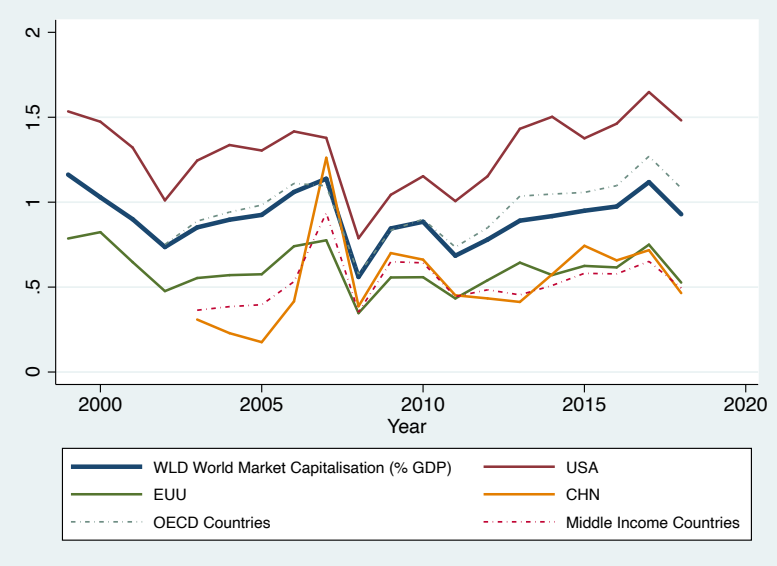


Fig. 1.2: Market Capitalisation (% of GDP) , 1999-2018

Note: This figure plots market capitalisation as % of GDP of the world and key centre economies (US, EU, China) in comparison to (advanced) OECD and (developing) Middle Income countries from 1999 to 2018. Author's estimates using World Federation of Exchanges annual data

When we compare liquidity, as illustrated in Figure 1.3 below, where the equity market turnover ratio across Africa was 4.8% in 2017 while the world turnover ratio was close to 100%. South Africa sets the bar on the continent with a turnover ratio of 25% in 2017, below its 20 year average of 28%.[12] Over that same period there are three episodes of synchronised material upticks in turnover volume globally (2008, 2011 and 2015); with the highest peaks on the US and European equity markets in 2008 and on the Chinese equity markets in 2015.

[12] The average turnover ratio 2013-2017 for Sub Saharan Africa was 27%, for the Middle East and North Africa was 38%. Source: African Long Term Finance Initiative database

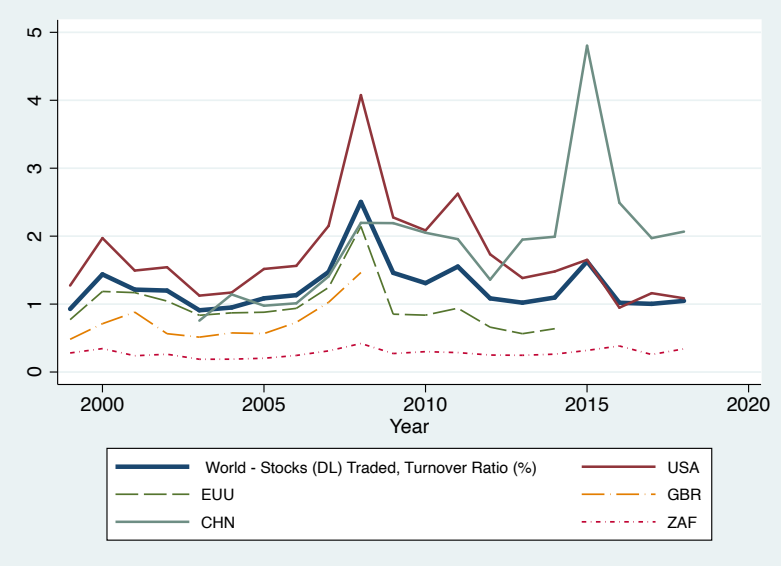


Figure 1.3: Comparative Turnover Ratios (%), domestic listed stocks traded, 1999-2018

Note: This figure plots the Turnover ratio of domestic listed stocks traded in of the world and key centre economies and markets (US, EU, China and the UK) in comparison to the most liquid stock market on the continent, South Africa between 1999 and 2018. Author's estimates using World Federation of Exchanges annual data

1.2.3 Structural factors influencing and determining risk premiums in public markets in Africa

Among the six structural variables identified in Hannan (2017) as determinants of capital flows to EMDEs, financial development and institutional quality present one of the data challenges with respect to Africa, in terms of frequency and comparability. Income per capita is a more quantitatively measured variable but data in this regard still suffers from comparability issues given initiatives by national statistics agencies in recent years to improve the collection, measurement and reporting of GDP data to capture both formal and informal economic activity. While foreign exchange reserves as a percentage of GDP is also a quantitative measure, the scaling relative to GDP embeds the ambiguity of measuring GDP over time in Africa. That said, it remains of directional value given the use of this variable to indicate aspects of financial stability. Finally, a number of approaches to measuring capital and trade openness and identifying exchange rate regimes have been developed in the literature but a narrow set of choices are actually applicable.

1.2.3.1 Institutional Setting in Africa

While there is significant empirical evidence that improvements in transportation drove the first wave of globalisation and that the second wave (post-Bretton Woods) was driven by an acceleration of the industrial age, it is the improvement in information and communications technology that have made the prospects international economic integration far easier in many respects as the world enters the digital age of globalisation. But in terms of financial globalisation

the institutional setting is a crucial aspect, defined by monetary and financial institutions for our investigation, specifically stock exchanges and central banks.

1.2.3.2 Financial Institutions – stock markets in primarily bank-based financial systems

The history of stock exchanges in Africa is somewhat distinct from broader financial development, insofar as the history can be used to tells a superficial story about capital market development. The establishment of domestic securities exchanges and specific measures to encourage domestic equity issuance have often been deployed as a broader policy signalling tool[13] over the mobilisation of domestic resources to address the persistent challenges African firms and entrepreneurs face in accessing capital.

Using the IFS and World Bank Joint Capital Markets Programme (JCAP) classification of capital market development, we find that the average level of development for the underlying countries in our sample would fall somewhere between the early and late phase of development but a number would clearly be classed as early stage and would find further development difficult.[14]

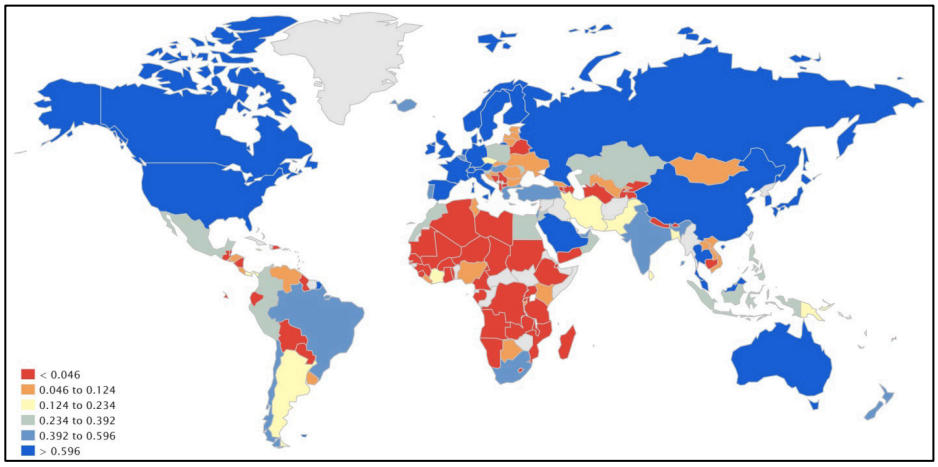


Figure 1.4: World Map of Financial Development – Financial Markets (2013)

Note: This figure maps global levels of the financial markets component of the broad-based index of financial development introduced by Kvirydzenka (2016). IMF estimates.

The isolation of the Financial Markets component of the IMF Index of Financial Development (Kvirydzenka 2016) provides data to map the state of financial market development for 183 countries in 2013. What is clearly observable in the map above is the extent to which Africa stands out as the region with the highest concentration of countries scoring lowest in that component of the index. On further inspection, we can see and take note of the patterns in the geography of development on the continent. On deeper inspection and comparing across global

[13] Weber, Klaus, Gerald F. Davis, and Michael Lounsbury. "Policy as myth and ceremony? The global spread of stock exchanges, 1980–2005." *Academy of Management Journal* 52.6 (2009): 1319-1347.

[14] Notably, the rule of thumb suggesting stock market development is difficult in economies with GDP of less than $20bn

regions a picture of the heterogeneity on the continent emerges. There are only eight countries in Africa not at the lowest level of development, in descending order of development - South Africa, followed by Egypt and Morocco, then Cote d'Ivoire and Mauritius, trailed by Nigeria, Kenya, and Botswana.

We can also make a series of comparisons to other countries at that point in time. The financial markets in South Africa were at a similar ranking of development to two emerging market countries in Latin America (Brazil and Chile), and one in Asia (India), as well as two advanced economies but emerging markets in Southern Europe (Greece and Portugal). The financial markets in Egypt and Morocco were at a similar ranking of development to three emerging market countries in Latin America (Mexico, Colombia and Peru), two in Asia (Indonesia and Philippines), one in Eastern Europe (Poland), and one in a frontier market in the Middle East/GCC (Oman).

The financial markets in Cote d'Ivoire and Mauritius were at a similar ranking of development to two emerging markets in Latin America (Argentina and Cost Rica) and in two frontier markets in South East Asia (Pakistan and Bangladesh). Finally, the financial markets in Nigeria, Kenya and Botswana were at a similar ranking of development to five frontier markets in Eastern Europe (Croatia, Latvia, Lithuania, Romania and Ukraine).

As a final complement to the comparisons above, table 1.1 below details the history of the initial creation of stock exchanges in Africa. It highlights the limited development from the late 19th to mid 20th century. It shows a period defined by the relative lack of development until the 1990s, including a completely fallow decade in the 1970s. It also demonstrates the gap in new exchange development at the start of the 21st century until 2008. Notably, it also illustrates how developments from 2010 to 2016 in terms of new securities exchanges are biased toward alternative asset classes and multi-country coverage.

Table 1.1 History of Securities Exchanges in Africa

Name of Securities Exchange	Acronym	Country	Year of Inception
Egyptian Exchange	EGX	Egypt	1883
Johannesburg Stock Exchange	JSE	South Africa	1887
Zimbabwe Stock Exchange	ZSE	Zimbabwe	1896-1924, 1948
Casablanca Stock Exchange	Casa SE	Morocco	1929
Nairobi Securities Exchange	NSE	Kenya	1954
Nigerian Stock Exchange	NSE/NGX	Nigeria	1960
Tunis Stock Exchange/Bourse de Tunis	BVMT	Tunisia	1969
Botswana Stock Exchange	BSE	Botswana	1989
Stock Exchange of Mauritius	SEM	Mauritius	1989
Ghana Stock Exchange	GSE	Ghana	1990
Swaziland Stock Exchange	SSX	Swaziland	1990
Namibian Stock Exchange	NSX	Namibia	1992
Lusaka Stock Exchange	LuSE	Zambia	1993
South African Furitres Exchange	SAFEX	South Africa	1995
Dar Es Salaam Stock Exchange	DSE	Tanzania	1996
Malawi Stock Exchange	MSE	Malawi	1996
Uganda Securities Exchange	USE	Uganda	1997
Algiers Stock Exchange/Bourse d'Algierie	SGBV	Algeria	1997
Bourse Régionale des Valeurs Mobilières	BVRM	Cote d'Ivoire +7 WAEMU members	1998
Mozambique Stock Exchange	BVM	Mozambique	1999
Ethiopia Commodity Exchange	ECX	Ethiopia	2008
Sierra Leone Stock Exchange	SLSE	Sierra Leone	2009
Nile Stock Exchange	NILEX	Egypt	2010
Bourse Africa	GBOT	Mauritius	2010
Rwanda Stock Exchange	RSE	Rwanda	2011
Seychelles Securities/ MERJ Exchange	Trop-X/MERJ	Seychelles	2012/2013
AltX East Africa Exchange	ALTX	Uganda	2013
Africa Exchange (Commodities)	AFEX	Nigeria (+ Kenya, Uganda)	2015
Angola Debt and Stock Exchange	Bodiva	Angola	2016

Note: This table traced the history of securities exchanges in Africa, noting the year each exchange opened and the country or countries covered/served. The sources of the data compiled by the author were individual and national securities exchanges directly.

1.2.3.3 Monetary Institutions – evolving policy frameworks and capacity

Below we summarise the remits of central banks in Africa and the evolution monetary policy prior to, during our sample period, and since to illustrate the institutional response over time to the credibility challenge that has driven the perception of institutional quality. Despite the variation in monetary policy frameworks on the continent, both by country and explicit or implicit monetary zones, and/or by virtue of historical developments and geographic realities, some generalisations can still be made with respect to monetary institutions. Between 2003 and 2016 the statutory foundations of monetary stability were strengthened across the continent. Central bank mandates were made clearer, resolution vehicle and a wider range of policy instruments were

created and/or made available. Efforts were also taken to provide the formal and regular communications required to ensure operations are more transparent.

The combination of higher nominal inflation rates (relative to advanced markets) and the composition of individual domestic inflation baskets had meant the pass-through of inflation volatility to macroeconomic volatility can be more evident. This drives corresponding effects on the external finance premiums (cost of capital) borne by local firms that can [or must] access capital from domestic banking systems. Episodic policy challenges, like those posed by high inflation and a local currency depreciation or market liquidity may therefore be met with different institutional responses. The success or failure of policy, depending on circumstance, may then come down to aspects of financial integration.

The notion of central bank independence is facing distinct contemporaneous challenges across the globe, with a key delineation between operational independence and instrument independence. To best illustrate the process of establishing the institutional basis in Africa, we present summaries below describing the remits and objectives of the monetary institutions as they have evolved in the three decades to the end of our sample period, by geo-political region.

1.2.3.3.1 Southern Africa Region [ZAF, NAM, BWA, ZMB]

At the outset, it is important to note that, in addition to being a key country in the Southern Africa region, South Africa not only led the continent in formally granting independence to its central bank, but it was also among the early global wave to adopt, operationalise and codify that policy consensus in 2000.

The South Africa Reserve Bank's mandate is to achieve and maintain price stability for balanced and sustainable economic growth in the country. The Bank has a considerable degree of autonomy in the execution of its duties, and its independence and autonomy are entrenched in the Constitution. The Bank's primary monetary policy goal is to contain inflation, and it can use any instruments of monetary policy to achieve this goal. The Bank holds regular discussions with the Minister of Finance and meets periodically with members of the Parliamentary Portfolio and Select Committees on Finance, and it is ultimately accountable to Parliament. The Bank implements monetary policy through a classical cash reserve system, with the main refinancing operation being the weekly seven-day repurchase auction. The Bank conducts a range of open market operations to manage liquidity in the market and to give effect to its monetary policy stance. The transmission mechanism of monetary policy is characterised by long, variable and uncertain time lags, and the success of monetary policy depends on the monetary authorities' accurate assessment of the timing and effect of their policies on the economy.

Namibia's monetary policy framework aims to promote and maintain a sound monetary, credit, and financial system and internal and external monetary stability. The ultimate goal is to ensure price stability in the interest of sustainable growth and development. The Bank of Namibia uses the repo rate as the main policy tool to influence monetary conditions in the country. The repo rate is kept close to the South African Reserve Bank's repo rate, as Namibia has a fixed currency peg to the South African Rand. The bank can use capital controls and prudential requirements to maintain a different repo rate from the South African Reserve Bank's repo rate when required. The asset price channel through bonds and stocks prices is less effective in Namibia due to the greater percentage of stocks and bonds held by institutional investors.

Botswana's monetary policy framework aims to maintain price stability and support economic growth and development. The monetary policy committee (MPC) uses a forecast-based approach to adjust policy when there is a significant divergence between the inflation forecast and the desired range of 3-6%. The MPC uses a range rather than a target and does not have a legal mandate for inflation targeting. The Bank of Botswana monitors and manages the money supply, sets reserve requirements for commercial banks, and uses various tools such as the benchmark interest rate, managing foreign exchange reserves, and conducting open market operations.

The Bank of Zambia's primary objective is to achieve and maintain price stability and promote financial system stability. The Policy Rate is the key interest rate used in signalling the monetary policy stance, and the Monetary Policy Committee meets quarterly to decide on the Policy Rate. Open market operations are used to manage the overnight interbank rate and the Policy Rate corridor defines the band within which the overnight interbank rate is allowed to fluctuate in line with the inflation target. The Bank uses a range of monetary policy instruments, including reserve requirements, open market operations, lending by the Central Bank, interest rate adjustments, direct credit control, moral suasion, prudential guidelines, and exchange rate adjustments. The key transmission channels of monetary policy in the Zambian Quarterly Models are the interest rate channel, the exchange rate channel, and the expectations channel.

We supplemented our analysis with the process of illustrating the macro context and performance relative to objectives of each country, in the largest geopolitical group of our sample, the Southern Africa region (SOA). This analysis used the related MI variables during the sample period and is presented in figure 1.10 in appendix A.

1.2.3.3.2 North Africa Region [EGY, MAR]

The Central Bank of Egypt's primary and overriding objective is price stability, with low rates of inflation being the medium-term goal. The bank plans to implement a formal inflation targeting framework, but in the meantime, it will steer short-term interest rates based on various

factors that may influence inflation. The Monetary Policy Committee makes monetary policy decisions and uses standing facilities and open market operations as policy instruments. The MPC meets on the first Thursday of each month to decide on policy rates and releases a communiqué immediately following its meetings. The bank published its first-ever monetary policy report in March 2017 with a target range of 13±2%.

Bank Al-Maghrib, the central bank of Morocco, has been entrusted with the primary mission of preserving price stability since the adoption of new legislation in 2005. The Bank uses appropriate instruments to ensure price stability and operates in the money market. The Bank uses the policy rate and the required reserve as the main instruments to achieve its objective of price stability. The analytical framework of monetary policy is designed to assess the risks weighing on price stability and is structured around two pillars: the real pillar and the monetary pillar. Bank Al-Maghrib reports four times a year and uses a forecasting mechanism to produce medium-term projections. Since 2018, Morocco has been transitioning from a fixed to a more flexible exchange rate regime, and on March 9, 2020, the fluctuation band of the dirham was widened to ±5%. The reform must comply with sound macroeconomic fundamentals, adequacy of the foreign exchange reserves, robustness and resilience of the banking system, and the adaptation of the monetary policy framework to inflation targeting.

1.2.3.3.3 French West Africa region [CIV]

French West Africa, covering the CFA currency zone and the Central Bank of West African States (BCEAO), based in Cote d'Ivoire, has a different monetary policy framework. These countries have a fixed exchange rate regime with the Euro and are not able to implement independent monetary policies. Instead, the BCEAO implements monetary policy on behalf of these countries, using policy interest rates and other policy tools to maintain price stability and promote economic growth. The BCEAO has limited independence, as it operates under the authority of the Council of Ministers of the West African Economic and Monetary Union (WAEMU). The BCEAO has used a fixed exchange rate regime (to the Euro) and thus also has limited exchange rate flexibility.

Our analysis was again supplemented by the process of illustrating the macro context and performance relative to objectives of each country, in this case, of a combined North and French West Africa regions (NFWA) during the sample using the related MI variables. This is presented in figure 1.11 in appendix A.

1.2.3.3.4 West Africa region [GHA, NGA]

The Central Bank of Nigeria's Monetary Policy Committee (MPC) is responsible for formulating monetary and credit policy to achieve the primary objective of maintaining price

stability and financial system stability, with a target inflation rate of between 6-9%. The Bank aims to create an environment of low inflation and interest rates that is conducive to inclusive and sustainable growth, and will continue to take steps to ensure banking system soundness and enhance the efficiency of the payments system. The nominal anchor for monetary policy will be the monetary targeting framework, complemented by an appropriate exchange rate regime, with growth in broad money closely monitored.

The Bank of Ghana's MPC is responsible for formulating and implementing policy to maintain stable prices, promote monetary stability, and support growth and employment. The Bank's monetary policy objective is to ensure price stability and support the government's economic objectives. The Bank sets a medium-term inflation target (currently 8±2%) and adjusts interest rates through the MPC to achieve the target. The MPC consists of seven members and meets bi-monthly to make decisions on interest rates. The Bank is accountable to Parliament and the wider public.

1.2.3.3.5 East Africa region [KEN, MUS]

The Central Bank of Kenya is responsible for formulating and implementing monetary policy to achieve and maintain price stability, promoting financial stability, and issuing currency. The Bank also regulates, supervises, and licenses financial institutions, manages foreign exchange policy, oversees payment and settlement systems, and acts as banker, adviser, and fiscal agent of the Government. Its mandate and objectives are to foster liquidity, solvency, and proper functioning of a stable market-based financial system, support the economic policy of the Government, formulate and implement foreign exchange policy, hold and manage foreign exchange reserves, license and supervise authorized dealers, and issue currency notes and coins. The Bank’s principal objective is formulation and implementation of monetary policy directed to achieving and maintaining stability in the general level of prices, measured by a low and stable inflation, and to sustain the value of the Kenya shilling. The Central Bank of Kenya uses several tools to counter changes in the market and influence price stability, including the Central Bank Rate (CBR) and foreign exchange market operations.

The Bank of Mauritius has the primary objective of maintaining price stability and promoting balanced economic development. The bank uses a two-pillar approach to its monetary policy, which involves economic analysis and evaluation of monetary developments to ensure that monetary policy does not overlook important information relevant for assessing future price trends. The Repo Rate is used as the key policy rate to signal changes in its monetary policy stance. The Bank of Mauritius uses open market operations to ensure that the overnight interbank money market interest rates move close to the Repo Rate. The minimum cash reserve ratio requirement on a bank's deposits and other liabilities is set at 4%, and banks must maintain two-week average

reserve balances at the Bank equivalent to this amount. The Lombard Facility and the Lombard Rate were abolished, and a new Standing Facility was introduced to provide overnight collateralized advances to banks. The Monetary Policy Committee is responsible for the formulation of monetary policy, and decisions on the policy interest rate are announced and explained on the central bank's website. The committee takes into account the views of the Bank, the Ministry of Finance and Economic Development, and other institutions or organizations in the discharge of its functions.

Finally, our supplementary analysis and illustration of the macro context and performance relative to objectives of each country during the sample period using the related MI variables presents the West and East Africa regions together in figure 1.12 in appendix A.

1.3 Literature Review

We begin the formal literature review with critical theory, then follow the thread to a seam of recent literature which includes both contrasting opinions and consensus views.

1.3.1 Critical theory

The standard trilemma in macroeconomics provides a critical theoretical strand underpinning a key debate we explore in our review of the relevant literature. Formally, the Mundell-Fleming trilemma, first articulated by Mundell (1963), posits the infeasibility of a country simultaneously having a fixed exchange rate, full capital mobility and monetary policy independence. The trilemma hinges on stark policy choices, with market forces imposing a scarcity of policy instruments. A country may simultaneously choose any two, but not all, of the following three policy goals; one, Exchange Rate Stability (ERS), the default being a fixed exchange rate to provide exchange rate stability, two, Monetary Independence (MI) expanded to monetary autonomy that allows for the setting of domestic interest rates and three, Financial Integration (FI) meaning unrestricted financial integration with the global financial market.

A significant body of work by Aizenman, Chinn and Ito (2008, 2010, 2016) and Aizenman and Ito (2012) in literature focusses on the development a set of indexes to analyse how the trilemma measures have evolved across various sets of economies and devised tests for assessing how they have managed those choices. Determining the right balance is the classic macroeconomic policy challenge. They conclude that EME 'experimentation' with liberalisation, specifically increasing financial openness while maintaining exchange rate stability) actually exposed them to the unintended consequences of increased financial integration.

A four-decade pattern in the policy goals of emerging markets around the trilemma measures exhibiting convergence toward a middle ground. The policy combinations adopted in search of it were, for some during the 1990s and early 2000s, aimed at lessening output volatility by reducing real effective exchange rate (REER) volatility. More generally, this 'constrained optimal solution' reframes the policy goals for managing the trilemma measures as managed exchange rate flexibility, controlled financial integration and limited monetary autonomy via a combination of active international reserve accumulation and monetary policy.

Rey (2013) sees only a dilemma between capital mobility and monetary independence where Aizenman, Chinn and Ito (2016) focus on gross international reserve accumulation as the fourth policy choice in a quadrilemma. However, Aizenman and Ito (2012) also note the pursuit by a periphery country of exchange rate stability and financial openness as more likely to strengthen links to the monetary policies of a centre country. Fahri and Werning (2014) see a different dilemma to Rey, in the specific context of volatile capital flows, particularly relevant to EFM in Africa. They highlight the importance of capital controls and flexible exchange rates to respond to sudden stops, which they model as risk premium shocks. However, they also highlight how capital controls remain an important tool with fixed exchange rates, given their ability to mitigate a recessionary impacts.

1.3.2 Monetary policy and macroeconomic and asset price volatility

Despite the famous conclusion drawn by Friedman (1963) that monetary actions affect economic conditions only after a lag that is both long and variable, his subsequent premise that they operate more quickly on equity prices than money expenditures is worth reiterating. His conjecture that both the stock market and businesses in the real economy reflect those preceding monetary actions is a thread through the decades to the supposed calming effect of macroeconomic stability on financial markets that eventually became entrenched in policy circles. The articulation by Bernanke and Gertler (2000) of what was an emergent monetary policy consensus set the stage somewhat for the global orthodoxy around the adoption of inflation targeting regimes and the desirability of independent central banks. Characterising these regimes as having high degree of institutional openness and transparency, logically leads to their principal argument - that price and financial stability are "highly complementary and mutually consistent" objectives of policy, the contention that a unified policy framework is the best means through which they are pursued, and the conclusion a regime of flexible inflation targeting provide the best chance of attaining those objectives.

When considering asset price volatility as an important dimension of increases in financial instability, for our purposes, their description of equity prices as "remarkably variable" is as notable as highlighting the instances of disconnection from current states of the real economy. This raises

the possibility of non-fundamental drivers of increased volatility. However, notwithstanding the challenges of two-way causality for estimating precise impact, the attendant risks of asset price volatility to become an independent source of economic challenges is a matter of degrees.

The experience with inflation volatility in emerging and frontier markets and in Africa was and is different, not least from the perspective of nominal anchors and resulting channel effects. The channels through which, for instance, external finance premium is affected can be more important for monetary policy to consider, than in the context of an asset price bubble that has balance sheet effects for firms.

Reflecting the bifurcations between developed and emerging markets, numerous studies opine on the strength of the linkages between growth dynamics and financial market performance. De Jong and De Roon (2005) noted the time-varying reduction in the cost of capital and expected returns as the degree of global integration increases in emerging markets. Yildrim (2016) finds evidence of a tight link in emerging markets between the strength of their macroeconomic fundamentals and the performance of their financial markets that also provides considerable explanation of country variation. Raddatz and Schmuckler (2012) and Puy (2013) both find pro-cyclicality between fund flows to emerging market economies (EMEs) and financial conditions in the investor home country often with independence from borrowing country variables.

An objective of our research is finding evidence of resilience in public capital markets in Africa, over time and through a critical periods, as a function of (monetary) institutions. Our interest in resilience is primarily in the context of the transmission of conventional and unconventional international monetary policy. As such, we need an applicable definition of public capital market resilience, that though related is somewhat distinct to prior definitions but also robust enough to eventually help determine whether and how much the relationship between asset price volatility and growth volatility is a function of institutions.

By general definition, resilience can imply a dynamic of improvement over time or stability over time. At its core, it is more than just the ability to withstand shocks but the capacity to evolve in response to them. The occurrence of and tendency to generate shocks assessed in a macro-financial context present the challenge of attempting to either; measure the ability of each of our panel country capital markets to return post-shock to their steady state (single equilibrium) or more likely, multiple equilibria post-shock, or measure a more complex adaptive system or model of resilience that attempts to measure the capacity for adaptation as opposed to measuring the rate at which a system returns to a static condition. Schinasi (2010) articulates the IMF definition of financial system stability – which can also fit with notion of the role of institutions in building resilience. Financial stability is defined in this case as a phenomenon occurring along an

expectations-based continuum, is dynamic in intertemporal and innovation terms and has a dependency on various elements of the system working in concert to efficiently allocate resources.

Calderon and Boreux (2016) however, led a BIS investigation into the resilience of output growth in SSA by comparing performance from a point during the Great Moderation/Stability to five years after the GFC. They split the period under analysis into sub periods, before 2008q4 when trade credit collapsed, exports dropped and commodity prices – the real channel, and after 2009q1 following years of rising financial globalisation financial flows collapsed - the financial channel. They then evaluated policy responses to the global financial crisis through two sets of time-varying indicators. One set of indicators captured structural vulnerabilities by exposure to international trade and global financial markets and the other set signalled macroeconomic vulnerabilities by the availability of liquidity policy buffers able to cushion external shocks.

The crucial finding was that the invariant nature of volatility of growth in SSA between 1995-2014 masked divergent trends between resource rich economies, where volatility was rising, and resource poor economies, where volatility was declining. Furthermore, following the global financial crisis fiscal balances have generally deteriorated. The empirical findings led to a forward-looking conclusion that the "resilience of growth will be recurrently tested – as either new shocks or new manifestations come across."

Near the end of our sample period when there was an emergent view that monetary policy in advanced economies was no longer a necessarily the primary driver of financial markets, Christensen and Upper (2017) address the issue of building resilience from the perspective of post-GFC challenges facing central banks in Africa. They highlighted the tendency for African economies to be less integrated with the global economy than other emerging market economies with a similar conclusion that global risks would now have both economic and political antecedents.

And finally, at the intersection of financial and monetary autonomy, Eichengreen and Gupta (2015) do not find evidence that better macroeconomic fundamentals will necessarily provide more insulation to EMDEs but rather that larger and more liquid financial markets within them may experience "more pressures", due investors having more degrees of freedom for portfolio rebalancing in those markets.

1.3.3 Transmission channels of liquidity, shocks and sentiment

In the literature on transmission channels and liquidity we start with Borio and Zhu (2011) highlighting the 'risk-taking channel' of the transmission of international monetary policy given the systemic or structural nature of the mechanism, describing it as "the impact of changes in policy rates on either risk perceptions or risk-tolerance and hence on the degree of risk in portfolios, on

the pricing of assets, and on the price and non-price terms of the extension of funding." They [also] note the evolution of the financial system in terms of liberalisation and innovation has played a role in its increased importance.

For our purposes, the impact on the pricing of assets is integrated with their discussion on the role of liquidity and their equally clear definitions for the two interrelated types of liquidity; funding/cash liquidity (meeting cash flow needs) and market liquidity (the ability to trade with minimal price impact), suggesting "ease with which perceptions of value can be turned into purchasing power." We have a strong focus on market liquidity and the critical assertion that the degrees of liquidity in any market are an "unobservable variable that denotes the key dimension of the impact of financial conditions on the real economy." They articulate three sets of principal effects of that impact, the first set operating via the "impact of interest rates on valuations, incomes and cash flows", the second set through the "relationship between market rates and target rates of return" and the third through the "communication policies and reaction functions of central banks."

Bruno and Shin (2014) examine the role of capital flows in monetary policy and the risk-taking channel of transmission by asking "how bank leverage fluctuates in the face of changing financial conditions" to then track "the consequence." They see the co-movement in exchange rates as the link between risk-taking globally and domestically.

In the literature on shocks, generally we note Eichengreen and Gupta (2015) do not find evidence that better macroeconomic fundamentals will necessarily provide more insulation to EMDEs but rather that larger and more liquid financial markets within them may experience "more pressures", due investors having more degrees of freedom for portfolio rebalancing in those markets. But Yildrim (2016) finds evidence of a tight link in emerging markets between the strength of their macroeconomic fundamentals and the performance of their financial markets that also provides considerable explanation of country variation

The literature on sentiment provided numerous insights. In Beber and Brandt (2009) on the capacity for macroeconomic news to have a measurable effecting beliefs and preferences. In Shiller (2017) developing a formal approach on narrative economics. In Kondratieff and Stolger (1935) positing on the long waves in economic in the last century through. In Chen and Siems (2004) discussing the effects terrorism can have on global capital markets. In Calderon and Kubota (2011) assessing the effect of different perspectives of local vs global investors at specific points in time during episodes of sudden stops in capital inflows. And in Gourinchas and Obstfeld (2012) using narratives from the previous century to devise new narratives for the current century.

Conclusions sketched by Lane (2016) about recent correlations between inflows and macro-financial risk proxies, given the focus on international financial flows in a specific SSA context between 1999 and 2014 are instructive. He finds the composition of financial flows to SSA differed materially to those in emerging markets, as financial flows continued to grow during the period. A similar assertion is made by Farhi and Werning (2014) in their relevant discussion on volatile capital flows.

However, the work of Cerutti, Claessens and Rose (2017) investigating the importance of the GFCy through capital flows, with an objective of measuring and quantifying the global financial cycle (GFCy) with standard econometric tool., drew a starkly contrasting conclusion. Rigorously covering inflows and outflows of FDI, debt, equity and credit between 1990 and 2015 for a broad cross section of countries (N=85, 21 advanced and 63 small economies which included 7 African economies) they concluded that periods of financial stress – that is high and/or rapidly rising values of the VIX or the dollar – do not seem to be systematically associated with unusual capital flows, measured at quarterly frequency, across (their) sample of countries."

Finally, Maggiori, Nieman and Schreder (2020) use a novel security level approach with a data set up to 2017 to establish the importance of currency as a factor in 'shaping' global portfolios, highlighting the shift in time series dynamics of cross border dollar holding post-2008, unique exception to home bias of global investors willing ness to hold us dollars

1.4. Data and Empirical Strategies

1.4.1 Approach to data given known challenges

We describe our use of financial and economic time series data, a rationale for our self-imposed frequency constraints and explain our choice of sample period. The challenge of data availability highlighted in the Jerven and Johnston (2015) evaluation of led us to collect and prepare of broad array of data with a view to experimentation to find the most relevant and useable data. There is only one instance of having to bridge a gap in missing data with an average. Our methodology makes use of standard econometric tools but seeks to adapt empirical approaches found in the literature

Quarterly is often the shortest reporting interval of many macroeconomic aggregates, including domestic product and national income. However, recent GDP rebasing exercises in various African countries, and the absence of reliable nominal GDP figures throughout the period (cross countries) provided a barrier to inclusion if the goal is a 'balanced' and complete panel. However, higher frequency intraday price data is not feasible and annual price data is to remote for our purposes. Daily or weekly data can be less relevant to quarterly data releases, or prove less

reliable than monthly in a cross section. At monthly frequency we were able to ensure of the widest array of potential economic and financial variables consistent across the largest potential population set of markets with the longest series

Within the first two decades of the twenty-first century we have identified a critical period, within what we would refer to as the second great wave[15] of financial globalisation, to scrutinise the integration of African capital markets with the global financial system. The single dataset we have complied is a monthly time series of financial and economic data covering a sample period from 2003 to 2017 for eleven African economies. It was chosen to start after period covering the productivity boom and technology bubble in US stock markets, and African countries (and financial institutions) began to access the international capital markets after reaching (Highly Indebted Poor Countries) HIPC completion points.

Nevertheless, our chosen sample period still spans an eventful period in global macro financial economic history capturing the end of the Great Moderation and extending to nearly a decade beyond the start of the Global Financial Crisis (GFC). The GFC itself is marked by (occurs within) official NBER US business cycle dating with contractions/recessions starting at the peak and ending at the trough of the cycle, with reference dates 2007Q4 (Dec) to 2009Q2 (June) and lasted 18 months from peak to trough. The period post-crisis/GFC period specific events of financial stress, shocks with associated spillovers and generated international monetary policy responses that changed global financial conditions or potentially altered the GFCy. These include the European Sovereign Debt Crisis (ESDC) the taper tantrum (TT) or the end of the commodity 'super cycle' precipitated by a downturn in demand from China.

1.4.2 Approach to panel construction

The criteria we used to construct the panel resulted in what might be generally characterised as panel having a small(er) N and large(r) T. However, the specific criteria used and how it was both strictly and broadly applied are described below. The first preferred qualifying criteria for African capital markets included is the existence of a securities market serving domestic investors across asset classes, resulting thirty-five (35) economies in Africa served directly by qualifying equity capital markets on twenty-six (26) stock exchanges. The second preferred qualifying criteria excludes those without one of the seventeen (17) recognised bond (government and corporate) markets deemed qualifying debt capital markets.

[15] Examples in the literature use the terms 'boom' and 'wave' nearly interchangeably to describe a sustained and material increase in activity, of various phenomena, over a period subsequently described as an 'era' or 'age'. We have chosen to use the term wave as it appeals to us as the best description of a process moving from centre economies outward over time while also aligned with the theory describing the long term structural development of modern economies with cycles lasting approximately half a century in length known as Kondratieff waves.

Next, we applied implicit market size, depth and development criteria by using data on equity market capitalisation and number of listed companies at the start of 2016 to exclude markets. We exclude markets which had less than ten (10) listed companies or an average listed company market capitalisation below $100m. The final limiting criteria was the existence of local stock index price series data for the entirety of our chosen sample period. Applying this criteria resulted in a final reduction of the set from thirteen (13) African capital markets to the ultimate sample set of eleven (11) African capital markets located in the following countries;

Botswana, Cote d'Ivoire, Egypt, Ghana, Kenya, Mauritius, Morocco, Namibia, Nigeria, South Africa and Zambia.

Despite including just over 40% of the continent's securities exchanges, the underlying economies served directly represent more than 75% of continental output and the exchanges domiciled host about 80% of the listed companies in the continent. The inclusion of the regional exchange, BVRM, located in Côte d'Ivoire (CIV) effectively means our coverage extends to nineteen (19) countries though we only utilise CIV country-specific macroeconomic variables in our analysis. But to that end, we are comfortable that our sample set constitutes a genuinely diverse sample of the population that yet represents the more developed capital markets in Africa. Table 1.2 below provides a description of the differences in construction of each local stock index comprising our panel.

Table 1.2: Panel construction, local stock index construction descriptions

Local Stock Index [A11 panel set] construction description and notes		
local stock index	**BBG code**	**index construction notes**
BVRM Composite Share Index	ICXCOMP	all (listed) share composite
Egyptian Exchange EGX 30 Price Index	EGX30	30 largest mkt cap and liquid, free float
Morocco (Free Float) All Share Index	MOSENEW	broad base free float, all share
Nairobi Securities Exchange 20 Index/All Share Index	KNSMIDX/NSEASI	price weighted, weighted mkt perf (40,30,20,10)*/all share composite
Mauritius Stock Exchange Index	SEMDEX	mkt cap weighted, all share
Botswana Gaborone Index	BGSMDC	mkt cap weighted, avg price, dom traded-only
FTSE JSE Namibia Overall/Local Index	FTN098/099	mkt cap weighted, free float, all share/only primary listings
FTSE JSE Africa All Share Index	JALSH	mkt cap weighted, top 99% of tot pre-ff all listed
Lusaka Stock Exchange All Share Index	LUSEIDX	all share
Nigerian Stock Exchange Main Board Index	NGSEINDX	value-relative weighted, all share (ordinary)
Databank Ghana Stock Index/GSE Composite Index	DSI/GGSECI	Databank proprietary (non-public at July 2003 top 5 77.21%)

Note: This table lists descriptions of the various methodologies used to construct composite (primary and secondary) indexes of the local stock exchanges in our sample compiled by the author from individual stock exchanges via Bloomberg

1.4.3 Approach to underlying country and regional dynamics

The United Nations Geoscheme[16] describes the geography of the continent and divides the fifty-four (54) countries on the African continent into 5 sub-regions ; at polar opposites, Northern Africa and Southern Africa, bounded by the coasts of the Atlantic and Indian Oceans, West Africa and East Africa, and covering the geographic centre of the continent, Central Africa (or Middle Africa). Our sample is roughly balanced across the continent but has no representation in Central/Middle Africa and is skewed to Sub Saharan Africa. The sample is composed of capital markets in nine (9) SSA countries covering the Southern, East, West and French African regions (via a regional exchange) and two (2) in North Africa, which in itself is geographically closer to Europe but more generally in an 'official' regional group with countries in the Middle East/Gulf (MENA). However, we further categorise and sort in multiple groupings for analysis as we construct our panel dataset.

1.4.3.1 Differences in economic composition in contrast to index composition

The first panel (a) of table 1.2 below illustrates how we have grouped and categorised the underlying countries in our sample. It is first split by BIS economic classification (resource and oil exporting economies and more diversified), then by two different regional dimensions. The regional dimensions could be described as broadly geopolitical and somewhat geoeconomic. The first regional dimension follows geography resulting in four (4) regional groups – Southern Africa (SOA, 4 countries), East and West Africa (EA, WA, 2 countries each) and a final group, North and French West Africa (NFWA, 3 countries).

The second panel (b) of table 1.2 below captures the additional contrast with the index composition in the underlying panel countries. In addition to highlighting the concentration of an individual stock index by measuring the weight of the top 5 (or 3 in Namibia) stocks where possible (ie excluding South Africa and Ghana), we note the industries and sectors represented by those top stocks in the remaining markets. This exercise emphasises the inability to distinguish the economic classification a country directly from the composition of the local stock index.

[16] Maintained by the UN Statistics Division (UNSD) department which coordinates activities of the global statistical system, supports the strengthening of national statistical systems and compiles the information contained in the UN Statistical databases accessible in multiple formats including UNdata

Table 1.3: Economic and Index Composition Dynamics

Economic Composition (BIS classification)	Region			Index Composition		
	country	geo pol	geo eco			
	id	region	zone/ar/c	local stock index	top 5 %wgt	industry/sector representation of top stocks
More Diversified Economies (MDE)	CIV	North French West Africa	CFA Zone	BVRM Composite Share Index	58.3%	3 Financials, 2 Telecommuncations
	EGY		MENA/ COMESA	Egyptian Exchange EGX 30 Price Index	61.0%	2 Financials, 1 x Materials, Telecommunications, Real Estate
	MAR		MENA/ ECOWAS	Morocco (Free Float) All Share Index	67.5%	4 Financials, 1 Materials
	KEN	East Africa	COMESA	Nairobi Securities Exchange 20 Index/All Share Index	82.0%	1x Consumer Discrectionary, Consumer Staples, Financials, Materials, Communications Services
	MUS		COMESA	Mauritius Stock Exchange Index	55.6%	3 Financials, 2 Consumer Staples
Resource and Oil Exporting Economies (ROE)	BWA	Southern Africa	COMESA	Botswana Gaborone Index	55.0%	4 Financials, 1 Consumer Discretionary
	NAM		ZAR CMA	FTSE JSE Namibia Overall/Local Index	77.5%	2 Financials, 1 Materials
	ZAF		ZAR CMA	FTSE JSE Africa All Share Index	-	
	ZMB		COMESA	Lusaka Stock Exchange All Share Index	69.5%	2 Materials, 1 x Consumer Staples, Communication Services, Financials
	NGA	West Africa	ECOWAS	Nigerian Stock Exchange Main Board Index	62.9%	1 x Materials, Consumer Staples, Conumer Discretionary, 2 x Financials
	GHA		ECOWAS	Databank Ghana Stock Index/GSE Composite Index	57.1%	-

(a) (b)

Note: This table presents the contrasting dynamics of the composition of the economies represented in our sample of capital markets in Africa in panel (a) and the composition of the underlying local stock indexes we utilised to represent those countries in panel (b). The sources of data compiled by the author are the Bank of International Settlements (BIS), Regional Economic Communities (RECs), individual national exchanges and index providers.

Table 1.3 below offers a further contrast of the composition of the MSCI Emerging and Frontier Market Africa Index, which serves as a proxy for a highly liquid portfolio, constructed on a continental rather than country basis. However, the country weighting to South Africa (c.90%) amounts to a concentration issue worth noting and accounting for when making comparison.

Table 1.4 Contrasting composition of the highly liquid portfolio

MSCI EFM Africa	
constituents	*93*
Sector	*weight as of 2017m6*
Consumer Discretionary	33.32%
Financials	26.60%
Materials	10.82%
Communication Services	8.62%
Consumer Staples	8.56%
Real Estate	6.50%
Healthcare	3.81%
Industrials	1.18%
Energy	0.54%
Utilities	0.06%
Country	*weight as of 2017m6*
ZAF	89.37%
NGA	2.81%
MAR	2.68%
"other"	1.80%
EGY	1.76%
KEN	1.58%
MUS	

Note: This table presents the composition weights for the index we use as a proxy for a Pan-African 'highly liquid portfolio", the MSCI Emerging and Frontier Markets Africa (MEFMA) Index. The sector weights are based on the Global Industry Classification Standards. The source of the data is MSCI and is as of the end of our sample period (2017m6).

1.4.3.2 Differences in financial integration (Chinn-Ito estimates)

We are able to assess a measure of financial globalisation, specifically contextualising financial conditions and the potential impact with a measurement of financial openness through the Chinn-Ito Index of financial integration. (*KAOPEN*). The Chinn-Ito index was initially developed to explore the linkages between capital account liberalization, legal, institutional and financial development, and test the effect of financial liberalization on equity market development in emerging and frontier countries. We have extracted the data from our sample presented in the two panels below, splitinto those economies classified by BIS as primarily Resource and Oil Exporters (ROEs) and More Diversified Economies (MDEs), from the original panel of 108 countries. It is a de jure measurement of the degree of capital account openness constructed to quantify the effect of restrictions on cross-border financial transactions. Index construction is based on 4 binary dummy variables codifying the tabulation of reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*, the variables indicate a. the presence of multiple exchange rates, b. restrictions on current account transactions, c. restrictions on capital account transactions, and d. requirements to surrender export proceeds.

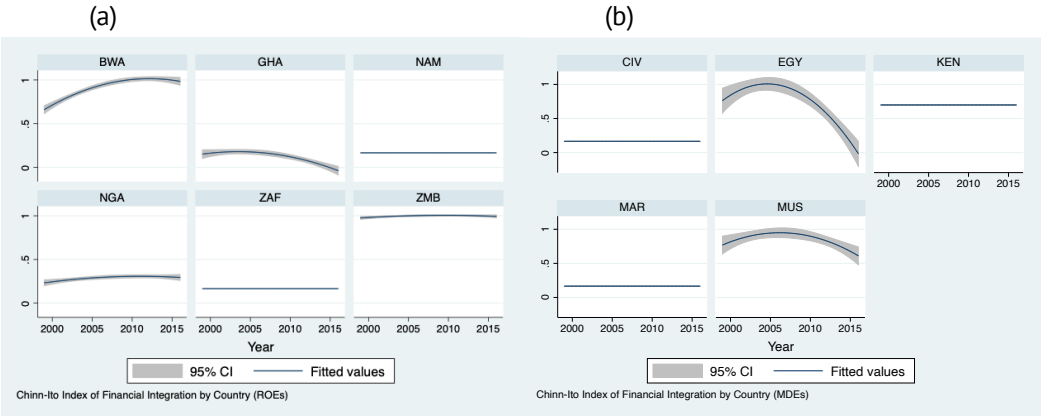


Figure 1.5 Comparing financial integration in ROEs and MDEs

Note: This figure compares levels of the Chinn-Ito index of financial integration of 2 country sets in our sample, split by economic composition, with panel (a) consisting of six (6) resource and oil exporting economies (ROEs) and panel (b) with five (5) more diversified economies (MDEs). The figure plots the quadratic fit of the index regressed on time between 1999 and 2016. The source of the data for the author's estimates is the 2019 update of Chinn and Ito (2006).

Figure 1.5 above captures the difference in financial openness and integration of the underlying sample countries, comparing groups of resource and oil exporting economies (ROEs) to the more diversified economies (MDEs). A quadratic fit to indicate the trend has been applied. Only Botswana became significantly more financially open and integrated during the period, from a relatively high base. Nigeria became marginally more financially open and integrated from a much lower base. Egypt, Mauritius and Ghana became less open or less integrated, with Ghana starting at

a relatively low base. The remaining countries were flat from an integration and financial openness perspective, but Zambia and Kenya did so from a reasonably high base, Zambia in particular. South Africa, notably among those exhibiting no change, was at the lowest relative level of financial integration.

1.4.4 Description of primary variables and instruments

In addition to the qualitative, annual and point in time data above, we have collected and created a monthly time series data for each country across a range of financial and macroeconomic variables. We have then subjected those variables to Augmented Dickey Fuller tests to confirm the absence of unit roots and consistency at integration order (*I, 1)* to allow us to run a set of coherent regressions.

Each local stock index (LSI) price series and those from key centre economies (KSI) both in local currencies) and the highly liquid portfolio (MEFMA) in USD, were log transformed and differenced to generate monthly returns as our measure of public market risk asset price performance, and to give us an implicit view on risk premia. Our expectations of normality are appropriate for financial time series.

Table 1.5 Summary statistics; primary dependent variables

ROE averages	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MoM change in log of Local Stock Index	972	**0.0089**	**-0.1946**	**0.1907**	**0.0028**	**0.0518**	**0.0009**	**5.8146**
Log(level) of Local Stock Index	978	8.8331	7.8386	9.5482	0.2249	0.4547	-0.5036	2.8203
MOM chg of Local Stock Index2	239	**0.0113**	**-0.0625**	**0.1326**	**0.0011**	**0.0317**	**1.0131**	**5.7759**
Log (level) of Local Stock Index2	241	6.3117	5.4812	7.0730	0.2923	0.5057	-0.2586	1.7402
MDE Averages	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MoM change in log of Local Stock Index	810	**0.0074**	**-0.2525**	**0.2009**	**0.0041**	**0.0610**	**-0.3403**	**6.1593**
Log(level) of Local Stock Index	815	7.8763	6.9456	8.3766	0.1235	0.3389	-0.8913	34.7704
MOM chg of Local Stock Index2	113	**0.0038**	**-0.2427**	**0.1719**	**0.0037**	**0.0608**	**-1.0878**	**6.5938**
Log (level) of Local Stock Index2	114	4.6649	3.9669	5.1688	0.0965	0.3106	-0.2047	1.8488
Averages, full panel set	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MoM change in log of Local Stock Index	1620	**0.0082**	**-0.2210**	**0.1953**	**0.0034**	**0.0560**	**-0.1542**	**5.9713**
Log(level) of Local Stock Index	1630	8.3982	7.4327	9.0157	0.1788	0.4021	-0.6798	17.3431
MOM chg of Local Stock Index2	352	**0.0088**	**-0.1226**	**0.1457**	**0.0020**	**0.0414**	**0.3128**	**6.0485**
Log (level) of Local Stock Index2	355	5.7628	4.9764	6.4383	0.2270	0.4407	-0.2406	1.7764

Note: This table presents summary descriptive statistics for the primary LSI (and secondary, LSI2, where applicable) for the equal weighted averages of the ROE and MDE subsamples and the full panel, log transformed local currency price levels and the first difference at monthly frequency. Author's estimates using data compiled from Bloomberg, Thomson Reuters and Databank

1.4.4.1 Grey Rhino Variables

We describe the macroeconomic time series variables as comprised as sets of grey rhinos[17], relative to the remaining two policy objectives embedded in the standard trilemma, monetary independence (MI) and exchange rate stability (ERS). For MI related variables, we use the nominal levels of the local monetary policy rate (LPR) and local consumer price inflation (CPI) in their own right to generate a series of monthly changes. But from the descriptive statistics presented in table 1.5 below we also note the significant difference in mean levels between ROEs and MDEs, with the mean level of monthly inflation in ROEs nearly double that of the MDE grouping. The LPR and CPI level variables are also used in combination to generate a backward looking variable approximating the local real interest rate with the use of a Fisher approximation.[18] We describe this variable as an ex-post hypothesised estimation of the local real interest rate (LRR). The key difference in the means of this variable between the ROE and MDE groups is essentially one of sign, with the ROE group mean having a negative monthly change.

Table 1.6 Summary statistics; country specific MI independent variables

ROE averages	*Obs.*	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
Local Policy Rate	975	0.1103	0.0625	0.1686	0.0027	0.0293	0.4498	**2.6712**
Local CPI	978	0.0914	0.0332	0.1944	0.0013	0.0346	0.6839	3.3794
Local Real Rate	975	0.0185	-0.0596	0.0988	**0.0011**	0.0317	0.2987	**2.9504**
MoM change in Local Policy Rate	969	**-0.0003**	-0.2230	0.1858	0.0033	0.0469	**-1.2847**	12.8880
MoM change in Local CPI	972	0.0123	-0.4919	1.2252	0.0322	**0.1577**	2.5621	29.9532
MoM change in Local Real Rate	972	0.3970	**-8.2622**	**55.3433**	61.7079	**5.4403**	3.0060	62.6432
MDE averages	*Obs.*	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
Local Policy Rate	795	0.0660	0.0459	0.1100	0.0003	0.0149	0.6990	4.7514
Local CPI	815	0.0600	0.0017	0.1776	0.0017	0.0364	1.0201	4.4575
Local Real Rate	795	0.0057	-0.0955	0.0757	**0.0015**	0.0335	-0.5924	3.8663
MoM change in Local Policy Rate	790	**0.0010**	-0.1545	0.2946	0.0024	0.0416	**1.3519**	**34.1274**
MoM change in Local CPI	810	0.0593	-3.3215	7.4272	1.6425	**0.9911**	2.8387	23.3046
MoM change in Local Real Rate	790	0.3124	**-23.8145**	**87.9388**	192.0288	**8.8427**	0.7487	80.7301
Averages, full panel set	*Obs.*	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
Local Policy Rate	1770	0.0902	0.0550	0.1420	0.0016	0.0228	0.5631	3.6167
Local CPI	1793	0.0771	0.0189	0.1867	0.0015	0.0354	0.8367	3.8694
Local Real Rate	1770	0.0127	-0.0759	0.0883	0.0013	0.0325	-0.1063	3.3667
MoM change in Local Policy Rate	1759	0.0003	-0.1918	0.2352	0.0029	0.0445	-0.0863	22.5423
MoM change in Local CPI	1782	0.0337	-1.7781	4.0443	0.7642	0.5365	**2.6878**	26.9311
MoM change in Local Real Rate	1762	0.3586	-15.3314	70.1594	120.9447	6.9868	**1.9800**	70.8645

Note: This table presents summary descriptive statistics for the primary variables related to monetary policy independence (MI) for the ROE and MDE subsample averages as well as the full panel average, nominal price levels and the first difference at monthly frequency). Author's estimates using monthly data compiled from the IMF IFS database

[17] The author's interpretation, application and preferred spelling convention of a conceptual description of the recognition of obvious, known or ignored risks introduced by Wucker (2016)

[18] ***Fisher approximation***

$r \approx i - \pi$

where, r = (local) real interest rate, I = nominal (policy) interest rate, and π = inflation rate

For ERS related variables we were limited to the use of the monthly values of the Local currency to the USD and the Euro only for practical and analytical reasons. During the sample period the data was not available from a reliable source for the CHN RMB, notwithstanding the management of the CHN currency. We also exclude the UK GBP, notwithstanding its freely floating exchange rate regime as befitting an open economy, due to the lack of availability of the data for the local currency to the GBP. The descriptive statistics reported in table 1.6 below indicate a parallel difference between the log level and monthly returns to the local currency in both the ROE and MDE groups, with negative mean change in monthly levels that larger by a similar factor to the negative mean monthly returns. However, using the full panel averages, the standard deviation of the monthly returns of the local currency to USD are slightly more than double those of the local currency to the Euro.

Table 1.7 Summary statistics; country specific ERS independent variables

ROE averages	*Obs.*	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
Log(level) of LCY/USD	978	**-1.0994**	-2.7664	2.1455	**0.1133**	**0.3196**	**-0.7136**	**2.4426**
Log(level) of LCY/EUR	978	**-1.3494**	-2.8595	1.8988	**0.0868**	**0.2756**	**-0.2093**	**2.4036**
MoM change in log LCY/USD	972	**-0.0038**	-0.3501	0.2239	**0.0018**	**0.0413**	**-1.5185**	**17.0338**
MoM change in log LCY/EUR	972	**-0.0048**	-0.3444	0.3008	**0.0019**	**0.0422**	**-0.6728**	**9.4381**
MDE averages	*Obs.*	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
Log(level) of LCY/USD	815	**-1.7822**	-2.1461	-1.5636	**0.0218**	**0.1310**	**-0.6962**	**4.1351**
Log(level) of LCY/EUR	815	**-2.0313**	-2.3027	-1.8924	**0.0120**	**0.0800**	**-0.7979**	**6.2271**
MoM change in log LCY/USD	810	**-0.0023**	-0.2244	0.0997	**0.0028**	**0.0321**	**-2.4210**	**28.6500**
MoM change in log LCY/EUR	810	**-0.0017**	-0.1870	0.0844	**0.0011**	**0.0256**	**-1.4615**	**18.7035**
Averages, full panel set	*Obs.*	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
Log(level) of LCY/USD	1793	**-1.4098**	-2.7664	2.1455	**0.0938**	**0.2853**	**-0.4158**	**2.3560**
Log(level) of LCY/EUR	1793	**-0.1861**	-2.8595	1.8988	**0.0205**	**0.0889**	**-1.3999**	**16.0529**
MoM change in log LCY/USD	1782	**-0.2290**	-0.3501	0.2239	**0.0162**	**0.0835**	**-0.5643**	**8.8735**
MoM change in log LCY/EUR	1782	**-0.0038**	-0.3444	0.3008	**0.0018**	**0.0413**	**-1.5185**	**17.0338**

Note: This table presents summary descriptive statistics for the primary variables related to exchange rate stability (ERS) for the ROE and MDE subsample averages as well as the full panel average, log transformed price levels and the first difference at monthly frequency. Due to date availability and practicality, only levels of the local currency to the USD and EUR are used. Author's estimates using monthly data compiled from the IMF IFS database

1.4.5 Identification of regime changes and other policy events causing structural breaks

Where McMillan and Thupayagale (2011) aimed to estimate long term volatility in a selection of eleven (11) African capital markets, at daily frequency, they chose to focus on identifying only the time on periods of sudden changes constituting structural breaks. Their concern was that the source of shifts in volatility persistence could not "readily be imputed." However, in a markedly different sample period with a different objective, and at monthly frequency, we do attempt to absolutely and relatively identify the source and causes of regime shifts that have bearing on our panels of African capital markets (with a larger underlying sample) insofar as we are testing whether primarily push or structural factors can provide causal evidence, with the GFC as the chief catalyst and push factor initiating a regime change(s).

1.4.5.1 De facto exchange rate regimes

The applied importance of exchange rate arrangements is illustrated in panel (a) of table 1.7 below showing the results calculating the distribution of de facto exchange rate regimes in the sample. Using information describing the taxonomy of exchange rate arrangement classification presented in the table (right) below, derived from IMF AREAR coarse classification data and augmented by the relevant country chronologies of said arrangements in Ilzetzki, Reinhart and Rogoff (2017) we manually coded monthly data during our sample period to include in our sample data set. We find a markedly different from the distribution in the panels used by Rey or Aizenman et al.

Table 1.8 De facto Exchange Rate Regimes distribution and classifications

a)

Sample distribution

DERR Classification	Frequency	%	Cumulative
1	434	24.21%	24.21%
2	901	50.25%	74.46%
3	430	23.98%	98.44%
4	0	0.00%	98.44%
5	28	1.56%	**100%**
Total	**1793**		

(b)

1 •	No separate legal tender
1 •	Pre announced peg or currency board arrangement
1 •	Pre announced horizontal band that is narrower than or equal to +/-2%
1 •	De facto peg
2 •	Pre announced crawling peg
2 •	Pre announced crawling band that is narrower than or equal to +/-2%
2 •	De facto crawling peg
2 •	De facto crawling band that is narrower than or equal to +/-2%
3 •	Pre announced crawling band that is wider than or equal to +/-2%
3 •	De facto crawling band that is narrower than or equal to +/-5%
3 •	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time)
3 •	Managed floating
4 •	Freely floating
5 •	Freely falling
6 •	Dual market in which parallel market data is missing.

Note: This table shows in panel (a) the sample distribution of exchange rate regimes in the dataset calculated on the basis of coarse classifications in panel (b) derived with the use of IMF AREAR data in Ilzetzki, Reinhart and Rogoff (2017)

We found significant clustering, nearly 25% in regime 1, lacking separate legal tender, a currency board arrangement or de facto peg, about 50% in regime 2, broadly a crawling peg, nearly 25% in regime 3 broadly a crawling band and the remaining <2% in regime 5, a freely falling currency. Notably, not one observation during a monthly period in which any African country in our sample during the sample period had a freely floating currency. The different distribution led us to conclude the use of de facto exchange rate regime as an instrumental variable in our model might be less salient with our sample and data set. However, we can manually identify the effective structural break by virtue of movement from one de facto exchange rate regime to another.

The observations in table 1.9 below identify five regime changes in four of the underlying countries in the sample set; Botswana, Ghana, Morocco and Nigeria. We also note domestic developments in two countries, Zambia (exchange rate policy) and Kenya (monetary policy) , whose de facto exchange rate regime did not change during the period.

Table 1.9 Observed de facto exchange rate regime changes

Observed de facto exchange rate regime changes			
ROEs	*month (classif./mov'mt)*	**MDEs**	*month (classif./mov'mt)*
BWA	**2015m12** (2 to 3)	CIV	none (1)
NAM	none (1)	EGY	none (2)
ZAF	none (3)	MAR	**2008m7** (2 to 1)
ZMB*	none (3)	KEN*	none (2)
NGA	**2004m6, 2015m3** (3 to 2 to 5)	MUS	none (2)
GHA	**2010m12** (2 to 3)		
*significant fx devaluation begininng 2013, continued pressure 2016, stabiised 2016/17		*2015m11(?), introduction of interest rate caps 2016m9	

Note: This table shows the author's observations of changes in de facto exchange rate regimes across the sample, by country in economic classification groups, including the year and month the regime change occurred, and derived with the use of IMF AREAR data in Ilzetzki, Reinhart and Rogoff (2017). Most of the variation in regimes is amongst the ROE countries.

We also observe that most of the variation in de facto exchange rate regimes occurs in resource and oil exporting economies, as are 80% of the regime changes during the period. We also take note the one country, Nigeria, that experienced two exchange rate regime changes during the sample period, but only one country, Morocco, experienced an exchange rate regime change in the event window the period corresponding to the GFC.

1.5 Model development: construction, extension and application

1.5.1 Introduction of base model

To improve our scope to explore the impacts of both the GFCy and/or a kGFCy, we use an iteration of equation 1.2, represented below:

$$\Delta y_{i,t} = \alpha + \beta \Delta VI_{k,t} + \theta \Delta LR_{k,t} + \lambda \Delta X_{i,t-1} + \kappa \Delta Y_{k,t-1} + \varepsilon_t \quad [1.3]$$

where,

$\Delta y_{i,t}$ is the monthly change in the log price of the local stock index (LSI) of each country_i , $\beta \Delta VI_{k,t}$ is the monthly change in log level of the volatility index (VI) of each key centre economy_k , $\theta \Delta LR_{k,t}$ is the monthly change in effective liquidity rate (LR) of key centre economy_k , $\lambda \Delta X_{i,t-1}$ is a vector, X, of the lagged monthly percentage change in a country specific variable, and $\kappa \Delta Y_{t-1}$ is a vector, Y, of the lagged monthly change in global or key centre economy variable, and ε_t is the error term/residual.

1.5.2 Dependent Variables

The dependent variable is the monthly return on our representative risk asset prices - in each underlying country in the panel the local stock index, in each key centre economy and in a Pan African index.

1.5.2.1 Base Pairs and Index

The four (4) price series for key (Centre Economy) stock indexes, (KSI) used to set base expectations for the model are the following: S&P 500 Index, Euro Stoxx 300 Index, FTSE 100 Index, CSI 300 Index. There is one (1) price series we chose to use as the proxy for a highly liquid portfolio of risk assets listed on capital markets across Africa: MSCI Emerging and Frontier Market Africa Index. Table 1.10 below provides descriptive statistics. Notably, while the MSCI EFM Africa Index has the highest mean monthly return, the S&P 500 and FTSE 100 exhibited the lowest volatility during the sample period.

Table 1.10: Summary statistics; KSI and Index

Variable name	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MOM % chg in S&P 500	161	0.0048	-0.1856	0.1023	0.0016	0.0398	-1.0320	6.1688
MOM % chg in Euro Stoxx 300	161	0.0033	-0.1424	0.1264	0.0017	0.0408	-0.8252	4.7893
MOM % chg in FTSE 100	161	0.0032	-0.1395	0.0811	0.0014	0.0372	-0.7502	4.1891
MOM % chg in CSI 300	161	0.0067	-0.2991	0.2463	0.0083	0.0912	-0.4625	4.1828
MOM % chg in MSCI EFM Africa	161	0.0073	-0.3063	0.1539	0.0048	0.0693	-0.7288	4.8498

Note: This table presents summary descriptive statistics for the monthly price return series of the KSIs and Index. The sample period for these observations is from 2004m1-2017m6. Data was compiled from Bloomberg and MSCI

1.5.2.2 Local Stock Indexes

The eleven (11) primary price series for local stock indexes (LSI) in the panel are : BGSMDC Index (Botswana), BVRM 10 Index (Cote d'Ivoire), GGSEC Index (Ghana), EGX30 Index (Egypt), KNSM Index (Kenya), SEMDEX Index (Mauritius), MOSENEW Index (Morocco), FTN098 Index (Namibia), NGSE Index (Nigeria), JALSH Index (South Africa), LUSEAS Index (Zambia).

Additionally, the set includes three (3) secondary price series for local stock indexes (LSI2) we considered; DS Index (Ghana), FTN099 Index (Namibia), NSEAS Index (Kenya). And finally, despite our focus on equity capital markets, the set also includes (8) tertiary price series for local sovereign bond indexes (LSBI) initially considered for robustness. They are all single country, local currency sovereign bond indices from the family of AFMI Bloomberg African Bond Indices (ABABI) from the following countries; Botswana, Egypt, Ghana, Kenya, Namibia, Nigeria, South Africa and Zambia.

1.5.3 Independent Variables

The explanatory variables represent the external transmissions of the global financial cycle, with β measuring risk sentiment (appetite and aversion) and θ representing the effective liquidity rate prevailing in the centre economy.

1.5.3.1 GFCy variables

For measures of risk aversion, in the first instance we mirror the literature on the best instrument to represent the global factor affecting all risky assets and use the CBOE Volatility Index (VIX) as the first measure of global risk aversion. Though the methodology has changed from inception when it measured the market expectation of 30-day volatility implied by options on the S&P100 Index, it remains the benchmark measurement of expected volatility in the US stock markets as implied by options on the broader S&P 500 Index.[19] For the three other key countries we utilize VIX analogues measuring expected volatility in those markets as an indication of the level of risk aversion present. The V2X is based on expected stock market volatility for the Euro Stoxx 300 Index, the VFTSE on expected stock market volatility for the FTSE 100, and the VAS on expected volatility of A shares in China trading as the CSI 300 Index. They are highly correlated (min 75%). For our measures of liquidity, again in line with the literature by start by using the Fed Funds Rate as the instrument of global liquidity but given the relevance and their investment and funding currencies we also use the respective policy rates of our key centre economies; the European Central Bank (ECB) Bank Rate, the Bank of England (BoE) Base Rate, and the People's Bank of China Lending Rate, but with each as continuous variable and average price, in contrast to the official policy rate changes. The correlations coefficients between liquidity measures are significantly lower (all under 30%).

Table 1.11: Summary statistics; GFCy and global variables

Variable name	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MoM change in log VIX	162	-0.0030	-0.4860	0.8526	0.0413	0.2032	0.6477	4.6402
MoM change in log V2X	162	-0.0013	-0.5158	0.6511	0.0331	0.1820	0.5184	3.9576
MoM change in log VFTSE	162	-0.0061	-0.4804	0.7098	0.0376	0.1940	0.6544	4.2834
MoM change in log VAS	156	-0.0012	-0.3787	0.6996	0.0342	0.1848	0.8328	4.0501
MoM change in Fed Funds	162	0.0000	-0.0096	0.0025	0.0000	0.0015	-3.1795	19.2587
MoM change in ECB rate	161	0.0002	-0.0068	0.0031	0.0000	0.0014	-2.5393	13.3727
MoM change in BOE rate	162	0.0002	-0.0240	0.0150	0.0000	0.0030	-3.3066	34.0466
MoM change in PBOC rate	157	0.0001	-0.0266	0.0270	0.0000	0.0062	0.1751	8.4850
MoM % chg World IP	163	0.0017	-0.1078	0.0980	0.0018	0.0419	0.0634	2.8971
MoM % chg US IP	163	0.0006	-0.0434	0.0146	0.0001	0.0072	-2.1322	12.3798
MoM % chg EU IP	163	0.0005	-0.0400	0.0340	0.0001	0.0112	-0.6939	5.1640
MoM % chg China IP	163	0.1191	-0.3151	0.2320	0.0034	0.0579	-2.5318	20.4954

Note: This table presents summary descriptive statistics for global and global financial cycle (GFCy) variables, the first difference of log transformed levels at monthly frequency. Author's estimates using World Bank and market data series of

[19] CBOE

varied length within the sample period from 2003m12-2017m6 accessed via Bloomberg. Data was compiled from CBOE via Bloomberg and the IMF IFS database

1.5.3.2 Global and key Centre Economy growth variables

For the global term k, at the correct frequency we are easily able to substitute a global measure of industrial production for global GDP growth into a set containing the comparative potential influences of industrial production in the US, Europe and China.

1.5.3.3 Global and key Commodity variables

We also experiment with substituting commodity price variables for the global growth proxy. From 3 critical groups of commodities (Oil, Precious Metals and Minerals, Agriculture), we collected monthly price data and created a first difference time series. The descriptive summary statistics are presented in table 1.10 below. Their selective application is based on analysis of import export dynamics of each individual country in the sample. By using the net exports term of the general GDP identity[20] we can infer changes in degrees of economic reliance on a particular commodity, if any, over time by comparing levels scaled to GDP at two points (2003,2017)in our sample period.[21]

Table 1.12: Summary statistics; Key Global Commodity prices

Variable name	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MOM % chg in spot price of crude oil ($)	164	0.0077	-0.3346	0.2898	0.0078	0.0881	-0.2463	4.10267
MOM % chg in spot price of crude oil (€)	164	0.0081	-0.3391	0.3234	0.0088	0.0938	-0.1049	4.05013
MOM % chg in spot price of platinum/oz ($)	164	0.0037	-0.3173	0.2474	0.0047	0.0683	-0.7145	6.22333
MOM % chg in spot price of gold/oz ($)	164	0.0085	-0.1756	0.1328	0.0027	0.0523	-0.1290	3.34209
MOM % chg in overall diamond price index	164	0.0009	-0.0600	0.0668	0.0061	0.0247	0.2179	3.07339
MOM % chg in 3m futures price of copper/tn ($)	164	0.0101	-0.3555	0.2968	0.0063	0.0797	-0.3419	5.96487
MOM % chg in spot price of cocoa/bg ($)	164	0.0054	-0.2011	0.2267	0.0065	0.0806	-0.0032	2.89887
MOM % chg in spot price of wheat/bshl ($)	164	0.0058	-0.2525	0.4233	0.0097	0.0984	0.6073	4.60133
MOM % chg in futures price of rice/bg ($)	164	0.0056	-0.2952	0.2191	0.0064	0.0803	-0.2845	4.23869

Note: This table presents summary descriptive statistics for key global commodity prices considered for global and/or country specific variables, the first difference of log transformed levels at monthly frequency. Author's estimates using market prices the length of the sample period from 2003m12-2017m6 accessed via Bloomberg.

1.5.3.4 Regional growth variables

In the absence of reliable nominal GDP proxies at monthly frequency for each country in the sample over the entire sample period we made a choice to use of regional industrial

[20] ***General GDP Identity***
$GDP_{i,t} = c + i + g + nx$
$GDP_{i,t} = c + i + g + (\boldsymbol{x} - \boldsymbol{m})$
where, c = private consumption + I = gross investment + g = government expenditure + nx = net exports, (x – m) = (exports – imports)

[21] See table 1.19 in appendix A, source: atlas.cid.harvard.edu

production (IP) data. This approach aligns with the broad geopolitical and geoeconomic categorisations we utilise while remaining consistent with the approach used in selecting proxies of global and key centre economy growth above. As such, we consider the six (6) below as proxies for and indicators of regional growth, through industrial activity, relevant to the underlying countries in the sample;

First, the primary geopolitical split on the continent, the Middle East and North Africa (MNA), Sub Saharan Africa (SSA). Next, two key monetary and financial groups on the continent, the South African Common Monetary Area (ZAR), and the Communauté Financière d'Afrique (CFA), Finally, two economically significant trade and development areas, the Economic Community of West African States (ECO), and the Common Market for Eastern and Southern Africa (ESA).

Table 1.13: Summary statistics; Regional variables

Variable name	Obs.	Mean	Minimum	Maximum	Variance	Std. Dev.	Skewness	Kurtosis
MoM % chg in MENA (region) IP	163	0.0226	-0.1364	3.2309	0.0649	0.2548	12.3509	156.0351
MoM % chg in SSA IP	163	0.0009	-0.0692	0.0735	0.0004	0.0208	-0.0250	4.4736
MoM % chg in ZAR (Rand zone) IP	163	0.0009	-0.0742	0.0804	0.0005	0.0220	-0.0872	4.6708
MoM % chg in CFA (WAEMU region) IP	155	0.0010	-0.1188	0.2192	0.0023	0.0478	0.9362	6.4778
MoM % chg in ECO (ECOWAS region) IP	157	0.0053	-0.3810	0.7388	0.0088	0.0937	2.8733	27.7396
MoM % chg in ESA (COMESA region) IP	157	0.0009	-0.0494	0.0518	0.0004	0.0194	-0.1438	3.2998

Note: This table presents summary descriptive statistics for regional industrial production (IP) as proxies for growth considered for use as country specific variables, the first difference of log transformed levels at monthly frequency. Author's estimates using monthly data compiled from the IMF IFS database accessed via Bloomberg

While these are not AU pillar Regional Economic Communities (RECs) per se, these groups have been chosen to reflect common monetary areas, common currency zones and common trade and development agreements. While countries have overlapping memberships in RECs, this is also a feature of the chosen regional proxies. Most of the other country-specific variables that we experiment with as representing domestic or institutional conditions, policy outcomes or as important components of growth have been discussed in an earlier section. First, in describing the grey rhino variables (MI and ERS) and second, in describing the possible influence of global key commodity variables. In the following section discussing results, we include another variable that serves as a traditional measure of financial stability for EMDEs and a proxy for growth for export-led economies in particular; foreign exchange reserves. Our use the monthly change of nominal foreign exchange reserves in USD is related to ERS, but only in the context of the GFCy and not the kGFCy variants.

1.6 Discussion of Results

We consider as a first step, estimating panel variable coefficients using univariate linear regressions to thoroughly assess variables under consideration for a parsimonious model. Therefore, the next step is a set of structural break tests of groups of selected variables. We

perform the Supremum Wald test with an unknown date on a winsorised selection of the data from the sample period for each group of selected variable at the panel or country level. Following that assessment, we plot a set of linear panel regressions lines. We look inside the panel and plot regression lines by country to compare to an equal weight pooled regression line. Finally, we compare regression lines of an equal split of the time series that covers before and after the GFC. We conclude with a basic vector autoregression of the full sample.

1.6.1 Results of coefficient estimations - Base Pairs of GFCy and kCE variables

But as a level setting exercise to anchor expectations, we run two initial sets of multivariate linear regressions based on equations 1.1 and 1.2. With equation 1.1 we established a range of baseline coefficient estimates by regressing changes in the key Centre Economy (kCE) stock exchange indexes, as the dependent variable, *ksi,* on changes in the key centre economy independent variables volatility and effective liquidity rates. That is, we attempt to specify, how much might changes in the VIX on its own, or changes in the US Federal Reserve Fed Funds Rate on its own explain changes in the S&P500, changes in V2X or the European Central Bank Rate explain changes in the ES300, changes in the VFTSE or the Bank of England Bank Rate explain changes in the FTSE100, and changes in the VAS or the Peoples Bank of China Rate explain changes in the CSI300 in the same period

At this stage, we should return to the explanation of how the data has been treated to inform the interpretation of the coefficients. All stock index data was first log transformed and the monthly change or log return is calculated as the first difference. A similar transformation process was applied to the volatility indexes. Therefore, the unit of change for the local stock index or volatility index result in coefficient estimates to be interpreted directly in percentage terms. However, because the effective liquidity rate within in the Euro Area turned negative at a point within the sample period the series cannot be log transformed and remains in percentage form. The unit of change for these rates is then assumed to be a basis points (.001) to be multiplied by the coefficient estimate in algebraic substitution.

But relying on R^2 to assess goodness of fit, we find satisfactory significant explanatory power from the base model, insofar as in the US case the model explains approximately 59% or the returns in the S&P 500, in the Euro Area c.53% of returns in the Euro Stoxx 300 and in the UK c.49% of returns in the FTSE 100. However, this model specification seems a poor fit in China, with an R^2 implying the model explains less than 2% of returns in the China Securities Index 300.

Deployment of equation 1.2, retaining the same dependent variable and base pairs of GFCy variables (volatility index and effective liquidity rate) of each kCE variables involves the addition of variables controlling for domestic and global economic activity. In place of country-specific control

variables related to ERS and MI or a key commodity we simply utilise the changes in relevant, k, industrial production and world industrial production one period earlier. However, we must note that our data set is missing the relevant key Centre Economy industrial activity measure for the UK. As such it is excluded from the reported results.

However, in table 1.14 below we do include the estimated coefficients for the UK base pair from the level setting exercise. While the test statistic for the VFTSE volatility index is strongly statistically significant, the test statistic for the UK effective liquidity rate, the BOE rate, indicates it is not statistically significant at all. The coefficients for the remaining kCE industrial production as country-specific variables interact with the global industrial production variable in different ways. The test statistic global IP for the US base pair indicates significance at the 5% level while for US IP significance at the 1% level is indicated. By contrast, the test statistic global IP for the EU base pair indicates significance at the 1% level while for EU IP significance at the 10% level is indicated.

Table 1.14: Results of initial panel coefficient estimations for GFCy and KCE variables

	y, Dependent Variables			
x, Independent Variables	*Base pairs, k=4*			
	[●]			
[a] GFCy variables (first difference, t)	kCE stock index			
volatility implied risk appetite indicator, β	coefficient	sig	t-stat	*obs*
MoM change in log VIX	-0.135	***	-12.12	*161*
MoM change in log V2X	-0.151	***	-11.62	*161*
MoM change in log VFTSE	-0.132	***	-11.95	*161*
MoM change in log VAS	-0.062		-1.55	*156*
effective liquidity rates, θ				
MoM %change in Fed Funds	7.39	***	3.66	*161*
MoM %change in ECB rate	6.58	***	2.83	*161*
MoM %change in BOE rate	0.623		0.64	*161*
MoM %change in PBOC rate	0.634		0.54	*156*
x, Control Variables				
[b] Global/Key Centre Economy variables (first diff, t-1)	[●]			
proxies for growth, industrial activity, λX	coefficient	sig	t-stat	*obs*
MoM % chg US IP	1.77	***	4.31	*161*
MoM % chg European Union IP	0.529	*	1.86	*161*
MoM % chg China IP	-0.046		-0.37	*161*
proxy for growth, industrial activity, κY				
MoM % chg World IP	0.157	**	2.11	*161*
	0.198	***	2.62	*161*
	0.184	**	2.67	*161*
	-0.003		-0.02	*161*

Note: This table presents the results of initial panel coefficients for the GFCy and kCE variables derived using equation 1.2 Note on 'sig' columns: *, **, and *** denote statistical significance (p-values) at the 10% (p<0.1), 5% (p<0.05), and 1% (p<0.01) levels respectively

1.6.1.1 Results of structural break test – GFCy base pairs

The results of the Supremum Wald tests on the GFCy variables are reported in table 1.13 below. We find significant a contrast between the first difference and levels in volatility indexes in general and despite a similarity in timing of statistically significant breaks. In both cases structural breaks are evident post-GFC, and in the case of the log level are also statistically significant. However, the first difference of VIX is the only variant that is statistically significant. The first difference and levels of the effective liquidity rates are significantly similar. In both cases structural breaks are evident within periods during the period of the GFC, and within 4 or 5 monthly periods of each other. The structural breaks identified in the US, EU and UK variants are significant to the 1% level while the CHN variant is not statistically significant.

Table 1.15: Results of Supremum Wald tests on GFCy base pairs

volatility implied risk appetite indicator, θ							
GFCy variable (1st difference)	est break date	swald stat	sig	*GFCy variable (log level)*	est break date	swald stat	sig
Δ in log of VIX	**2012m6**	**10.964**	*	log of VIX	**2012m6**	**22.995**	***
Δ in log of V2X	2012m6	8.9437		log of V2X	**2012m6**	**11.425**	*
Δ in log of VFTSE	2011m10	7.6993		log of VFTSE	**2012m6**	**19.783**	***
Δ in log of VAS	2011m10	4.9404		log of VAS	**2011m10**	**10.52**	*
effective liquidity rates, ϑ							
GFCy variable (1st difference)	est break date	swald stat	sig	*GFCy variable (level)*	est break date	swald stat	sig
Δ in Fed Funds rate	**2008m3**	**19.155**	***	Fed Funds rate	**2007m11**	**125.26**	***
Δ in ECB rate	**2009m3**	**23.968**	***	ECB rate	**2008m10**	**168.67**	***
Δ in BOE rate	**2008m11**	**143.66**	***	BOE rate	**2008m10**	**319.85**	***
Δ in PBOC rate	2011m6	1.7706		PBOC rate	2010m6	8.086	

Note: This table presents the results of Supremum Wald tests for structural breaks in the first difference and log levels of the GFCy variables of four key centre economies. Note on 'sig' columns: *, **, and *** denote statistical significance (p-values) at the 10% (p<0.1), 5% (p<0.05), and 1% (p<0.01) levels respectively

1.6.2 Results of coefficient estimations – Index with regional and global variables

We also establish a set of alternative baselines with an index chosen represents a liquidity focussed portfolio of stocks with broad Pan African constituent membership. We perform regressions of the monthly changes the MSCI EFM Africa Index as the dependent variable with slight variations. We use all four of the base pairs of volatility and effective liquidity rate indexes as the independent variables and utilise the monthly change, one period earlier, of all six regional industrial production and the spot oil price (in USD) as the control variables. Results are reported in table 1.14 below. The notable results to highlight are that all 4 estimated coefficients for the volatility indexes are significant to the 1% level while the coefficient for the Fed Funds rate is only significant at the 5% level. The only regional growth proxy with a significant coefficient is MNA IP, and only at the 10% level. The coefficient for US IP is significant at the 1% level and global IP significant at the 5% level.

Table 1.16: Results of initial panel coefficient estimations for the Index with regional and global variables

	y, Dependent Variable			
x, Independent Variables	*Index ('highly liquid' portfolio)*			
	[●]			
[a] k/GFCy variables (first difference, t)	mefma			
volatility implied risk appetite indicator, θ	coefficient	sig	t-stat	*obs*
MoM change in log VIX	-0.1701	***	-7.28	*161*
MoM change in log V2X	-0.1652	***	-6.08	*161*
MoM change in log VFTSE	-0.1676	***	-6.72	*161*
MoM change in log VAS	-0.1714	***	-6.27	*156*
effective liquidity rates, ϑ				
MoM %change in Fed Funds	9.24	**	2.58	*161*
MoM %change in ECB rate	5.66		1.41	*161*
MoM %change in BOE rate	3.1	*	1.72	*161*
MoM %change in PBOC rate	0.0981		0.11	*156*
x, Control Variables				
[b] Regional variables (first diff, t-1)	[●]			
proxies for growth, industrial activity, key commodity, λX	coefficient	sig	t-stat	*obs*
MoM %chg in MNA IP	-0.0415	*	-1.96	*161*
MoM %chg in SSA IP	-0.0414		0.88	*161*
MoM %chg in ZAR IP	-0.0677		-0.79	*161*
MoM %chg in CFA IP	0.0258		0.44	*155*
MoM %chg in ECO IP	0.0848		1.42	*157*
MoM %chg in ESA IP	-0.0622		-0.02	*157*
MoM % chg in a key commodity [1 of oil ($€), gold, copper, diamonds, cocoa]	0.0923		1.5	*161*
[1c] Global/Key Centre Economy variables (first diff, t-1)				
proxies for growth, industrial activity, κY	coefficient	sig	t-stat	*obs*
MoM % chg World IP	0.322	**	2.51	*161*
MoM % chg US IP	2.74	***	3.8	*161*
MoM % chg European Union IP	0.1136		0.23	*161*
MoM % chg China IP	0.0381		0.4	*161*

Note: This table presents the results of initial panel coefficients for the Index with regional and global variables estimated using equation 1.2. Note on 'sig' columns: *, **, and *** denote statistical significance (p-values) at the 10% (p<0.1), 5% (p<0.05), and 1% (p<0.01) levels respectively

1.6.2.1 Results of structural break test – Global and regional growth proxies

We then perform Supremum Wald test with an unknown date on a winsorised selection of the data from the sample period for each individual variable at the panel or country level.

Table 1.17: Results of Supremum Wald tests on regional/global

global growth proxies, κ				***regional growth proxies, λ***			
Control variable name (1st difference)	est break date	swald stat	sig	*Control variable name (1st difference)*	est break date	swald stat	sig
Δ in World IP	2009m3	1.5286		Δ in MNA IP	2006m2	6.1263	
Δ in US IP	**2008m11**	**29.11**	***	Δ in SSA IP	2007m11	6.172	
Δ in EU IP	**2009m5**	**19.358**	***	Δ in ZAR IP	2007m11	5.1871	
Δ in China IP	**2013m12**	**55.844**	***	Δ in CFA IP	2008m3	54,577	

Note: This table presents the results of Supremum Wald tests for structural breaks in the first difference of variables we use as proxies for global and key centre economy growth and the regional growth proxy choices (algorithmic substitution and statistical significance) for use as country growth variables. Note on 'sig' columns: *, **, and *** denote statistical significance (p-values) at the 10% (p<0.1), 5% (p<0.05), and 1% (p<0.01) levels respectively.

1.6.3 Results of coefficient estimations – core(+) dependent variable(s) of interest

We gather the last set of coefficient estimates from regressing changes in a panel of our core dependent variable plus a set of alternates the primary and secondary local stock exchange indexes and a local sovereign bond index) on changes in the individual GFCy, global and kCE variables and regional and country-specific, grey rhino variables we have experimented with throughout. These results reported in table 1.16 will allow us to conclude the testing of both hypotheses {H1, H2].

Next, we run linear regressions of the monthly change in the primary local stock exchange index , LSI on the monthly change, in the same period, in the volatility index of the US, the VIX, followed by three remaining volatility indexes, V2X, VFTSE, VAS. We then run another set of linear regressions with same dependent variable, LSI, regressed on the effective liquidity rates of the US, Euro Area, UK and China. These results are in column [1] of panel (a). We repeat these regressions for the smaller set of secondary local stock exchange indexes, with the results presented in (column [2], of panel (a). Colum 3 of panel (a) presents the regressions for the tertiary index of local sovereign bond

We then consider a range of control variables, at a one period lag, that fall into 2 broad groupings – first, country and/or regional control variables in one group in panel (b) and global and key centre economy control variables in panel (c). Again, starting with our core dependent variable of interest in column [1] of panel (b) we report the results of regressing the monthly change in the LSI on the previous month change in four individual country specific variables, three related to ERS; monthly changes in the nominal level of foreign exchange reserves (in USD), and the monthly change in local currency to USD and the Euro respectively, and one constructed variable related to MI. We complete this section of estimations with three further panel regressions with the same dependent variable; on the monthly change in a choice of two (of six) regional industrial production indexes (specifically relevant to each *i*, ranked) and the monthly change in a key commodity (again, specifically relevant to each *i*). In column [1} of panel (c) we also report the

results of regressing the monthly change in LSI on the previous month change in four final measures of industrial production, world, US, the European Union[22] (and China.

Next, we complete the set of panel variable coefficient estimates by repeating the regressing the monthly changes in the following dependent variables; LSI2 in column [2] and LSBI in column [3] with results in the respective columns of panel (c) of table 1.16. We conclude this stage by plotting a range of residuals vs fitted to check for random observations. Consequently, we drop the monthly change in nominal foreign exchange reserves in USD variable. The first key result is the lack of statistically significant coefficients in column (3) with LSBI as the dependent variable. The fact that the exception is the estimated VFTSE coefficient, and only at the 10% significance level, struck us as spurious. Each series is of the LSBI variable is varying length, but all begin post-GFC with the earliest beginning in 2010m1. This aspect combined with the lack of significance means it is of no value for addressing H2, so we discard these results.

Table 1.18: Results of Initial Panel Coefficient Estimations

	y, Dependent Variables											
x, Independent Variables	*full panel, i=11*				*i=3*				*i=8*			
	[1]				[2]				[3]			
[a] k/GFCy variables (first difference, t)	local stock index1				local stock index2				local soveriegn bond index			
volatility implied risk appetite indicator, θ	coefficient	sig	t-stat	*obs*	coefficient	sig	t-stat	*obs*	coefficient	sig	t-stat	*obs*
MoM change in log VIX	-0.0472	***	-6.99	*1782*	-0.0244	**	2.32	*352*	-0.0047		-0.93	*346*
MoM change in log V2X	-0.0526	***	-6.98	*1782*	-0.0331	***	-2.76	*352*	-0.0056		-0.93	*346*
MoM change in log VFTSE	-0.0449	***	-6.2	*1782*	-0.0276	**	-2.51	*352*	-0.0089	*	-1.68	*346*
MoM change in log VAS	-0.0522	***	-6.84	*1716*	-0.0276	**	-2.17	*334*	-0.0044		-0.61	*298*
effective liquidity rates, ϑ												
MoM %change in Fed Funds	4.98	***	5.42	*1782*	2.15		1.27	*352*	-1.17		-0.43	*346*
MoM %change in ECB rate	9.98	***	9.65	*1771*	5.85	***	3.35	*349*	-0.8174		-0.31	*338*
MoM %change in BOE rate	3.29	***	7.18	*1782*	1.59	**	1.96	*352*	0.396		0.16	*346*
MoM %change in PBOC rate	0.3654		1.62	*1727*	0.0788		0.22	*348*	0.0202		0.09	*346*
x, Control Variables												
[b] Country-specific/Regional variables (first diff, t-1)	[1]				[2]				[3]			
proxies of growth, components and institutional policy outcomes, λX	coefficient	sig	t-stat	*obs*	coefficient	sig	t-stat	*obs*	coefficient	sig	t-stat	*obs*
MoM %chg in FX Reserves (in USD)	-0.06		-0.03	*1782*	0.0007		0.04	*352*	0.0105		0.66	*346*
MoM %chg in Local Real Rate (ex-post hyp)	-0.0004	***	-2.92	*1758*	0.0003		0.31	*352*	0.0002		1.38	*344*
MoM %chg in log LCY/USD	0.1323	***	3.75	*1771*	0.0565		1	*352*	-0.0007		-0.03	*346*
MoM %chg in log LCY/EUR	0.0515		1.46	*1771*	0.0106		0.19	*352*	-0.0082		-0.38	*346*
MoM % chg in Regional IP1[a] [1 of MNA,SSA,ZAR,CFA,ECO,ESA]	0.023	*	1.95	*1745*	-0.0009		-0.02	*342*	-0.0027		-0.13	*321*
MoM % chg in Regional IP2[a] [1 of MNA,SSA,ZAR,CFA,ECO,ESA]	0.056	*	1.76	*1767*	0.0188		0.17	*352*	-0.0231		-0.36	*341*
MoM % chg in a key commodity [1 of oil ($€), gold, copper, diamonds, cocoa]	0.086	***	4.82	*1782*	0.0113		0.039	*352*	0.0209		1.23	*346*
[c] Global/Key Centre Economy variables (first diff, t-1)												
growth proxies for industrial activity, κY	coefficient	sig	t-stat	*obs*	coefficient	sig	t-stat	*obs*	coefficient	sig	t-stat	*obs*
MoM % chg World IP	0.0489		1.48	*1782*	0.0224		0.41	*352*	0.0365		1.34	*346*
MoM % chg US IP	1.57	***	8.37	*1782*	1.44	***	4.57	*352*	0.076		0.31	*346*
MoM % chg European Union IP	0.574	***	4.86	*1782*	0.2664		1.31	*352*	0.0643		0.53	*346*
MoM % chg China IP	0.0162		1.16	*1782*	-0.0109		-0.87	*352*	-0.0021		-0.12	*346*

Note: This table presents the results of initial panel regressions, the reported coefficients were estimated using equation 1.3

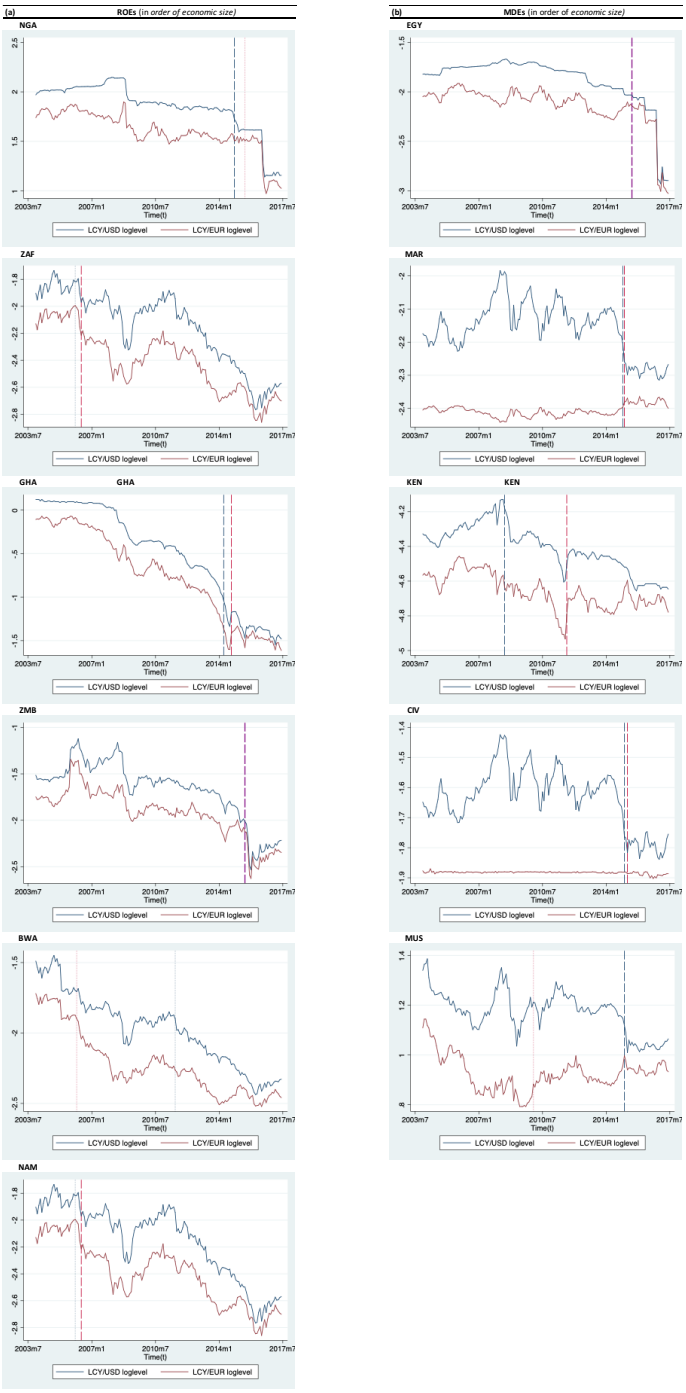
[22] As it existed during the majority of the sample period, this data technically includes the industrial production of the UK

The next result of note is in the bottom panel (c) in column (2) with LSI2 as the dependent variable. The only statistically significant control variable coefficient is for US IP, at the 1% level, with a significant higher coefficient than elsewhere. In column (1) of the bottom panel (c) we report statistically significant coefficients at the 1% level for monthly changes in US and EU IP, however the US coefficient is again orders of magnitude larger. And last, in the middle panel (b) we report statistically significant coefficients at the 1% level for monthly changes in the LRR, the local currency to USD and a key commodity variables. We also report statistically significant coefficients at the 10% level for monthly changes in the regional IP variables.

1.6.3.1 Results of structural break test of select ERS grey rhino variables

We return to an ERS grey rhino variable to supplement the observations of exchange rate regime changes in in the previous section discussing data and empirical strategies. Figure 1.6 below illustrates the calculated structural breaks identified in changes in the log levels of the local exchange rate the USD and the Euro. The results presented show the ROEs in panel (a) and MDEs in panel (b) by countries ranked by economic size, as of the end of the sample period.

We observe similar negative performance of both exchange rates during the sample period of countries in the ROE group, though the paths of the NGA local currency to USD and Euro exhibit periods of stability with prices gapping downward sharply, reflecting the multiple exchange rate regimes in operation. The paths of the NAM Dollar and ZAF Rand mirror each other, and the structural breaks identified are at the same pre-GFC points in the time series. Ultimately, this is reflective of the complete lack of monetary autonomy in NAM as a member of the CMA with its currency pegged to the Rand and limited scope to deviate from monetary policy decisions of the SARB. The identified structural breaks in NGA, GHA and ZMB are in the post-GFC period of the time series, while for BWA they straddle the GFC period, with the structural break in changes the local currency to Euro is pre-GFC and to the USD occurs post-GFC. Both are of immaterial statistical significance.



(a) (b)

Figure 1.6: Observed structural breaks in exchange rates (log) levels, by country

Note: This figure illustrates the structural breaks in ROE (a) and MDE (b) countries presented in economic size rank order. exchange rates by plotting monthly change in log levels of the local currency to USD (blue) and local currency to Euro (red) over the sample period The structural break identified in the Supremum Wald tests (results in table 1.8) are marked using a dashed line (statistically significant) or dotted line (statistically insignificant).

We observe significantly more variation in the paths of the local currency to the USD and Euro in the MDE group in panel (b), and wider divergence between the paths. This is particularly evident MAR and CIV. However, in the case of CIV, its membership in the a currency zone (CFA) pegged to the Euro is the explanation, notwithstanding the identification of structural breaks in both occurring 1 monthly period apart post-GFC in CIV. The identified structural breaks occur at the same post-GFC point in the time series in MAR. Identified structural breaks in changes of the KEN local currency to USD and Euro straddle the GFC period straddle, with the break in the change in local currency to USD variable actually occurring within the GFC period and to the Euro post-GFC. Finally, in EGY we observe the local currency to USD and Euro following a similar path in NGA, exhibiting a long periods of stability with a sharp downward gap in prices post-GFC and near the end of the time series.

1.6.4 Linear regressions

We fit linear regression lines by country, which provides evidence allowing us to reject the null hypothesis (H1) in the first instance, and note the negative slope and reasonably wide confidence interval (95%) of the pooled regression line in figure 1.7 below.

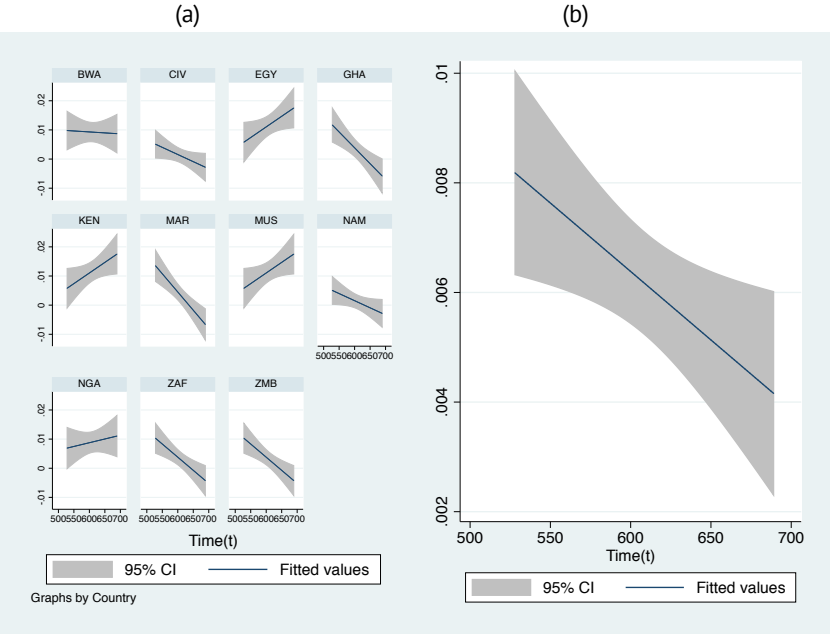


Figure 1.7: Regression lines – by country, pooled

Note: This figure plots fitted linear regression lines based on equation 1.2 by country in panel (a) and equally weighted and pooled in panel (b)

We also fit linear regression lines for the pooled group but with the sample equally split. This allows us to observe the nature of differing linear relationships, a negative pre-GFC slope and thin confidence interval (95%) and a positive slope post-GFC but wider confidence band. With

confirmation if their difference with an equality of means test allows us to reject the null hypothesis (H2) in the second instance.

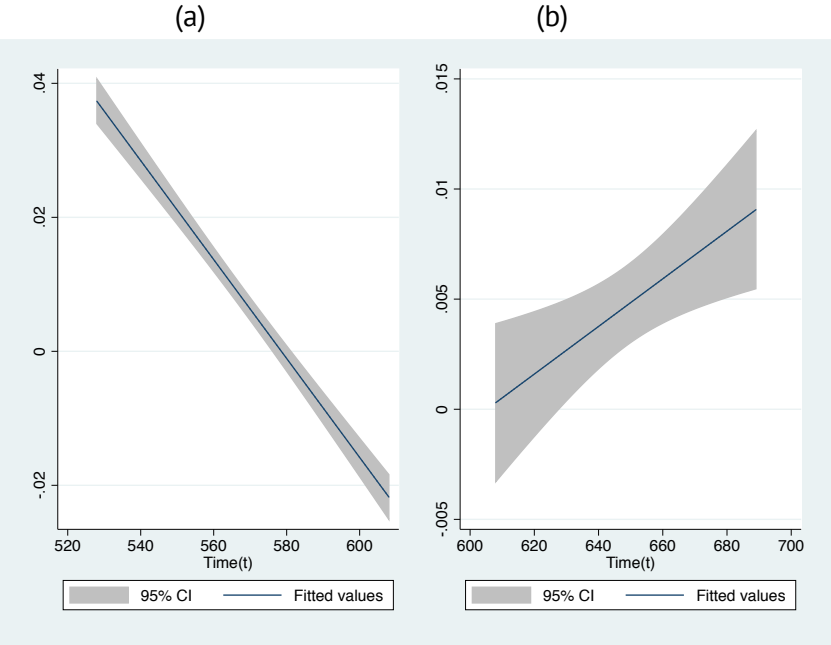


Figure 1.8: Regression lines – equally split sample of pooled countries

Note: This figure plots fitted linear regression lines based on equation 1.2 with a spilt sample, with the plot in panel (a) covering the pre-GFC period and the plot in panel (b) covering the post-GFC period

1.7 Conclusions

We begin this final section discussing the conclusions of this chapter with a clear statement about the sum of our results - they allow us to reject the null of our adjacent hypotheses. We can clearly reject the strongest form of H1 that African capital markets are sui generis. We are also able reject the null hypothesis of H2 that stated the resiliency of African capital markets to the k/GFCy remained fixed through the GFC.

With respect to H1, we found that where economic size was not reflected in capital market size, lower levels of market resilience could be traced, in part, to the institutional setting at the country-level. From our focus on the role of specific financial institutions, we took note of distinctions and emerging and frontier markets (EFMs). In practice, most (10 of 11) of the equity capital markets in our country sample are frontier markets (FM). From our focus on the role of specific monetary institutions, we note that during the sample period, the variation in central bank relative performance and against objectives might be explained by interaction with economic composition, given our bifurcated categorisation. Though historically lower across the full sample, nominal inflation was higher and more volatile among ROEs than MDEs, with a mean negative monthly change in ROEs and a mean positive monthly change in MDEs.

We also found evidence that seems to indicate liquidity certainly matters. Comparison of the estimated coefficients of the highly liquid portfolio to those of the kCEs and the panel, actually suggested the influence of the GFCy may be strongest for MEFMA than the either other group. However, a key may be the country weights in this portfolio, dominated as it is by ZAF.

With respect to H2, we were able to establishe the GFCy and one variant of kGFCy (EU) are statistically significant external influences. They are potentially mitigable at the country-level by domestic conditions, though the influence of the US dominant GFCy is stronger. To that, end we perform a limited experiment and ran a basic VAR, forecasting the response of the pooled local stock index response to the VIX and Fed Funds rate noting, in figure 1.9, below the persistence of the response to changes in the Fed Funds rate relative to the response to changes in the VIX. We take this insight into the next chapter to deploy this tool with significantly more rigour.

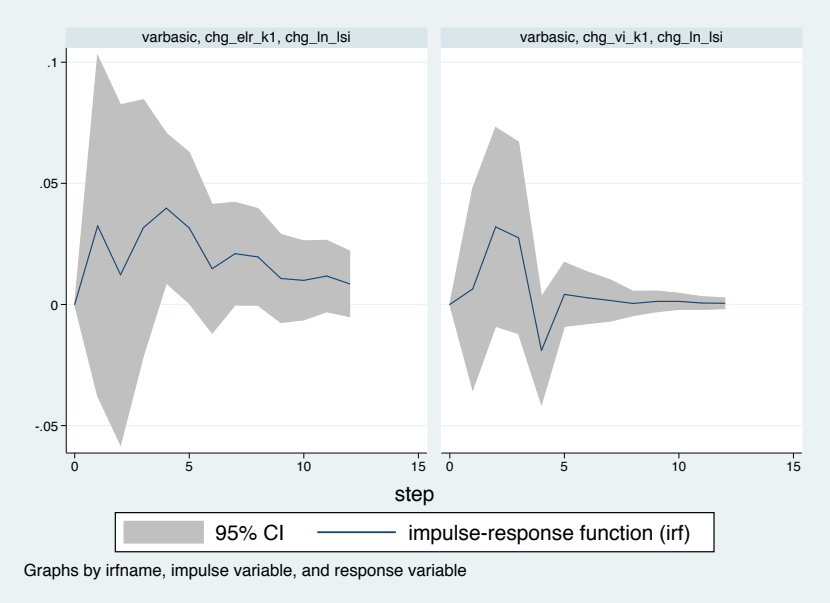


Figure 1.9: VAR basic impulse response functions

Note: This figure shows the forecasted IRF of the pooled panel LSI to a one unit shock in GFCy impulse variables in equation 1.1

Finally, other results in this chapter underlined the importance of the exchange rate channel for external financial flows, in fact similarly in both local currency to USD and Euro. This may also point to the enduring influence of narratives and perception for risk sentiment and for asset valuation and price volatility. This ultimately belies the evidence of asymmetric integration with global capital and financial markets and confirms that institutions and policy choices do matter. It also suggest that a rising tide may not lift all boats, but only those that meet certain conditions.

Appendix A

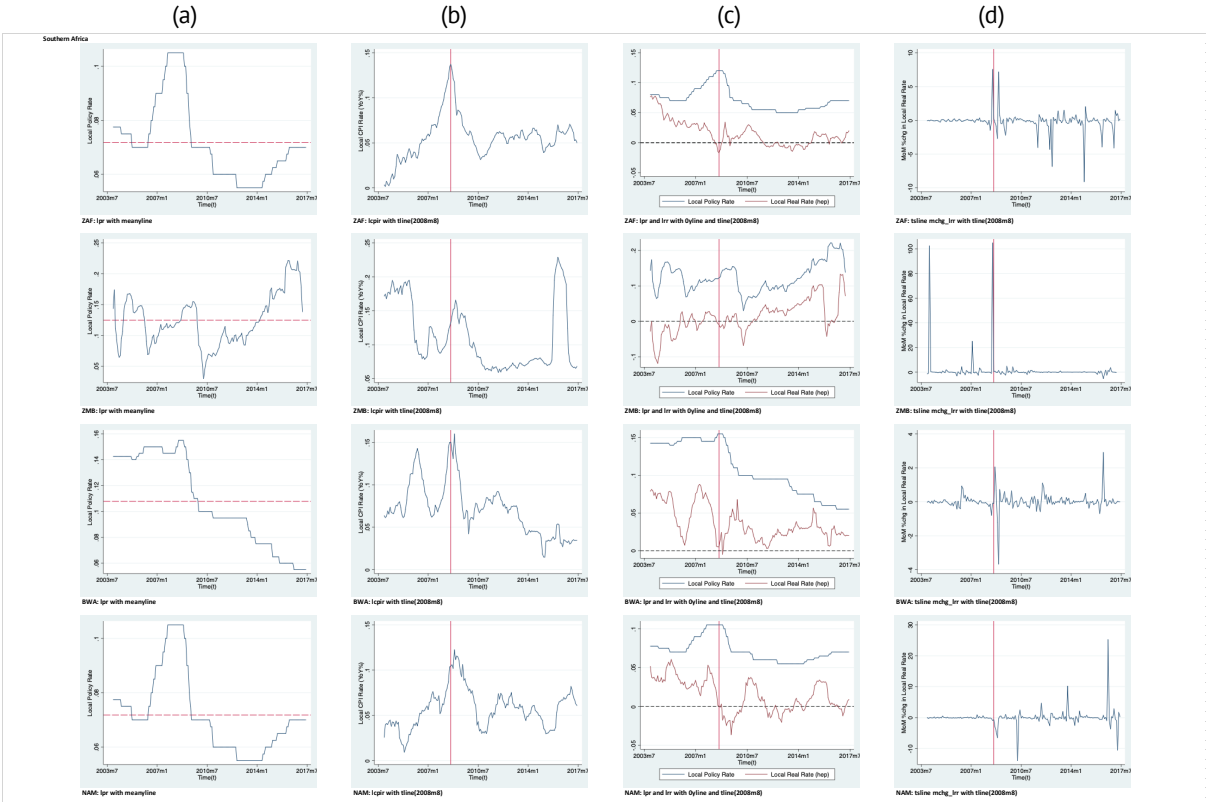


Figure 1.10: Macro context, by region: Southern Africa (SOA), 2003-2017

Note: This figure illustrates macroeconomic context with the variables related to MI for each country in the SOA region, panel (a) plots the path of the local monetary policy rate and the mean level (dashed line) during the period, panel (b) the path of inflation with the mid-point of the GFC marked (vertical line), panel (c) plots the paths of the local monetary policy rate and the local real rate with zero level marked (dashed line) and mid-point of the GFC marked (vertical line) and panel (d) plots the monthly change in the local real rate and the mid-point of the GFC marked (vertical line). Author's calculations with data from the IMF IFS database.

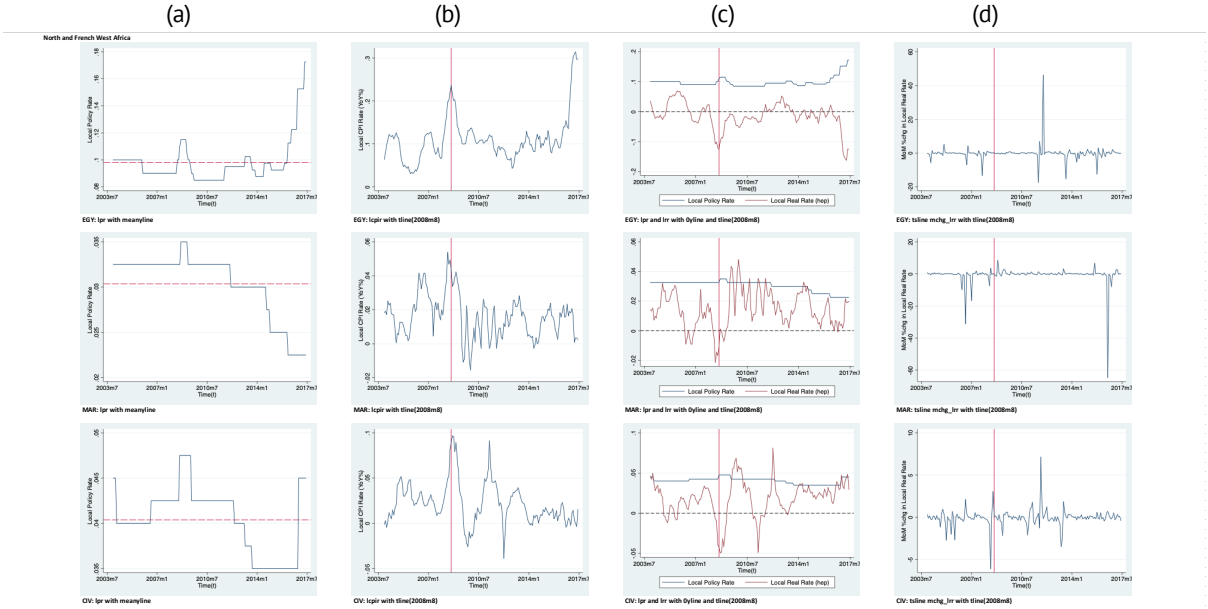


Figure 1.11: Macro context, by region: North and French West Africa (NFWA), 2003-2017

Note: This figure illustrates macroeconomic context with the variables related to MI for each country in the NFWA region

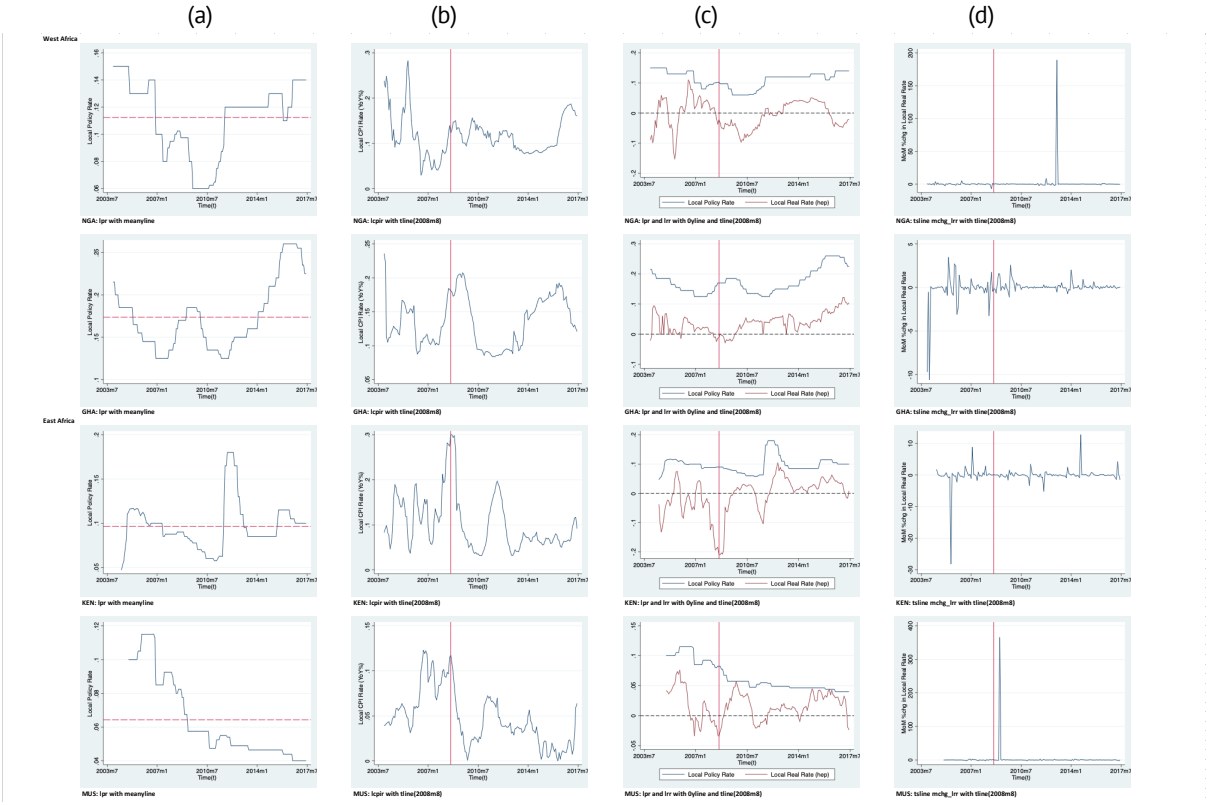


Figure 1.12: Macro context, by region: West Africa and East Africa (WA, EA), 2013-2017

Note: This figure illustrates macroeconomic context with the variables related to MI for each country in the WA and EA regions

Table 1.19: Export Import dynamics and complexity, sample countries 2003 v 2017

	Top 2 Exports	Total Exports ($ bn)	Top Exports % share of GDP	Value of Top Exports ($ bn)	Top 2 Exports	Total Exports ($ bn)	Top Exports % share of GDP	Value of Top Exports ($ bn)
	2003	2003	2003	2003	2017	2017	2017	2017
BWA	Diamonds, Tourism	2.80	0.78	2.19	Diamonds, Tourism	7.05	0.88	6.21
NAM	Travel and Tourism, Fish	1.54	0.32	0.49	Diamonds, Unrefined Copper	5.44	0.31	1.66
ZAF	Travel and Tourism, Platinum	50.00	0.18	8.87	Gold, Travel and Tourism	113.00	0.22	25.09
ZMB	Refined Copper, Travel and Tourism	0.92	0.39	0.36	Unrefined Copper, Refined Copper	7.83	0.57	4.47
CIV	Cocoa beans, Cocoa Paste	5.33	0.42	2.23	Coco Beans, Cashew nuts and coconuts	12.60	0.33	4.21
EGY	Travel and Tourism, Transport	19.50	0.40	7.89	Transport, Travel and Tourism	47.70	0.34	16.38
MAR	Travel and Tourism, ICT	16.40	0.36	5.83	Travel and Tourism, ICT	44.80	0.31	14.04
KEN	Transport, Tea	3.86	0.25	0.95	Transport, ICT	10.30	0.31	3.15
MUS	Travel and Tourism, Transport	3.12	0.33	1.03	Travel and Tourism, ICT	5.21	0.49	2.54
NGA	Petroleum oil (crude), ICT	25.70	0.85	21.74	Petroluem oil (crude), Petroleum gas	48.40	0.79	38.41
GHA	Cocoa beans, Travel and Touri	2.61	0.42	1.10	ICT, Gold	19.00	0.54	10.19

	Top Import	Total Imports ($ bn)	Top Import % share of GDP	Value of Top Import ($ bn)	Top Import	Total Imports ($ bn)	Top Import % share of GDP	Value of Top Import ($ bn)
	2003	2003	2003	2003	2017	2017	2017	2017
BWA	Travel and Tourism	4.14	0.06	0.23	Diamonds	7.05	0.25	1.73
NAM	Petroleum oil (refined)	1.76	0.08	0.14	ICT	6.43	0.07	0.45
ZAF	Transport	39.90	0.08	3.18	Transport	96.60	0.07	6.36
ZMB	Transport	1.59	0.15	0.23	Transport (but tdd*)	7.56	0.12	0.89
CIV	Petroleum oil (crude)	2.74	0.17	0.46	Transport	12.70	0.15	1.89
EGY	ICT	24.80	0.11	2.69	Transport	86.80	0.09	7.43
MAR	ICT	16.70	0.07	1.13	Transport	50.40	0.08	4.05
KEN	Petroleum oil (refined)	4.04	0.08	0.31	Petroleum oil (refined)	20.70	0.11	2.20
MUS	Transport	3.00	0.13	0.40	ICT	6.92	0.13	0.87
NGA	ICT	19.40	0.14	2.63	ICT	55.00	0.12	6.46
GHA	Petroleum oil (crude)	4.38	0.12	0.54	ICT	23.60	0.28	6.57
					*trade data discrepancies		0.1856	

Note: This table contains information used for comparative analysis of changes in the top 2 exports and top import in each of the sample countries in 2003 and 2017. The exports of only 2 countries remained the same in both periods (shaded). The annual data was obtained from the Atlas of Economic Complexity

Table 1.20: Data Sources

Variable description	Source
Effective Liquidity Rates - Fed Funds rate (monthly)	Federal Reserve Board Statistics Database
Effective Liquidity Rates - ECB rate (monthly)	European Central Bank Statistical Data Warehouse
Effective Liquidity Rates - BOE rate (monthly)	Bank of England Database
Effective Liquidity Rates - PBOC rate (monthly)	Bank of International Settlements Statistics Database
Local Monetary Policy Rates (monthly)	IMF International Financial Statistics Database
Local Currency to USD, Euro (end of period, monthly)	IMF International Financial Statistics Database
De Facto Exchange Rate	Ilzetzki, Reinhart Rogoff (2017)
Local Consumer Price Inflation (monthly)	IMF International Financial Statistics Database
Industrial Production (key economy, regional, world)	IMF International Financial Statistics Database
FX Reserves, USD (annual)	Lane and Milesi-Ferreti (2007) External Wealth of Nations II 2017 update
Net Portfolio flows (annual)	Lane and Milesi-Ferreti (2007) External Wealth of Nations II 2017 update
FX Reserves, USD (monthly)	IMF International Financial Statistics Database
Volatility Index (VIX, V2X, VFTSE, VAS)	Chicago Board of Exchange, dowloaded from Bloomberg
Key Stock Index (S&P500, FTSE100, EuroStoxx300, CSI300)	Bloomberg
Local Stock Index price series (14)	Bloomberg, Thomson Reuters, Databank (Ghana)
MSCI Emerging and Frontier Markets Africa Index	MSCI, downloaded from Bloomberg
Equity Market Capitalisation (global, regional)	World Federation of Exchanges Database, African Long Term Finance Scoreboard Dataset
Equity issuance (global, regional)	World Federation of Exchanges Database, PWC Africa Capital Markets Watch 2019
Bond Market Issuance Outstranding	African Long Term Finance Scoreboard Dataset, AFMI Database
AFMI Bloomberg African Bond Index price series (8)	African Financial Markets Initiatve, downloaded from Bloomberg
Local Institutional Investor Assets under Management	OMFIF Absa Africa Financial Makets Index 2018
Foreign Direct Investment (annual)	World Development Indicators Database
Financial market development	IMF Index of Financial Development (Kvirydzenka 2016)
Economic Composition	Bank of International Settlements Statistics Database
Index Composition, index weights	Bloomberg, National Sources, MSCI
Imports and Exports (USD, % of GDP, annual)	Atlas of Economic Complexity Database
Trilemma Indexes (MI, ERS, Financial Openness/KAOPEN)	Aizenman, Chinn and Ito (2010) 2019 update
Commodity Prices(USD, Euro, monthly)	Bloomberg
Regional macro data	AfDB African Economic Outlook Database, World Economic Outlook Database

Note: This table contains a full list describing variables considered and used in the pReg model with their sources.

Chapter II: *Analysing the geopolitical economy and financial market determinants of public equity price behaviour within Africa*

'when two elephants fight, it's the grass that suffers'

- African proverb -

2.1 Introduction

The standard case perception of African markets as sui generis does not hold, not least because market resilience to external shocks varies within regions in African and at the country level within Africa. But Africa remains susceptible to unitary explanatory narratives[23]. However, improvements in or improving the economic resilience of Africa, as an economic bloc might be more necessary in the aftermath of the global financial crisis (GFC). Though the GFC originated in the US with a credit crisis, the shock to the global economy had a lasting effect at the frontier of the global financial architecture.

At the same time, the empirical evidence of a global financial cycle has been growing. Identifying patterns in how individual markets have developed as their industrial strategies guide the evolution of their economies within regions on the continent, is of increased importance in two key areas. First, because policy choices matter in the longer run. Second, because in the shorter term those policy choices come into contact with events.

The transmission of global risk appetite in an economic landscape defined by financial shocks derived of geopolitical rivalries may have a degree of path dependency, notwithstanding the efficacy of various channels of transmission. Alongside different historical, political and economic ties/alliances and affinities, structural factors present in individual countries and regions are often beyond entire domestic control. These can pose ongoing challenges for policy makers, while also providing opportunities for investors.

However, the resilience of equity markets in Africa is continually tested by a range of financial development feature and characteristics. Principally, the issues of stock and flow / size and liquidity continue to matter but the fundamentals of the domestic economy should also play a role alongside the state of the local financial ecosystem. Institutions, including those representing the local and regional investor base, are important. Including international investors in the assessment of the investor base increases the salience of institutions, especially in the context of a

[23] The contrasting narratives of 'Africa Rising' vs the 'Hopeless Continent' within a decade

continental bias to bank-based over market-based finance. International participation in African capital markets also highlights the role of exchange rates in transmitting global risk appetite, and the necessity for emerging and developing countries to consider capital flow measures in terms of gates and walls as discussed by Klein (2012).

To explore the links between history, geography, politics, and economics at the intersection of financial markets, specifically public markets, more specifically risk capital (equities) in Africa, we can note regime changes and shifts, inside and outside event windows, in the global financial architecture from two perspectives. That of frontier and emerging market economies in the so-called global south, and in the context of re-emergence of a Great Power competition, principally between the US and China, but with the additional role of the EU. In specific terms of the reality of relations with African countries and how the effect can impact the flows of capital and direction of trade. Where the US hegemony can be defined as the dominance of the dollar, the challenge from China can be defined through trade relationships strengthened through the Belt and Road Initiative (BRI), the insertion of the EU into the equation can defined as the influence on governance through its export of regulation through standards that are relevant to the growth of technology.

Multipolarity might require multiple alignments for different reasons – but especially for small and middle powers. And because globalisation has been a distinctly deflationary phenomenon – literally exemplified by the Great Moderation[24] period that effectively ended with the global response to the GFC – the prospect of geo-economic fragmentation and the unwinding of globalisation towards a trend described variously as de-risking or de-globalisation[25] – exemplified by re-shoring, near-shoring and friend-shoring in terms of supply chain – could be an inflationary phenomenon (thus the potential for greater volatility in inflation and growth means different things for different countries, not least those still at the frontier of the global financial architecture like the economies in Africa.

The risks of fragmentation are real. The IMF has recently forecast scenarios where increasing restrictions on the trade in goods and services across countries could reduce global GDP by up to 7% - at current rates that is equivalent to 3 times the size of the economy of Sub Saharan

[24] This term originates in a paper, Stock and Watson (2002), exploring whether and how business cycles may have changed, to describe a period, spanning the tenure of Federal Reserve Chairman Alan Greenspan, characterised by low macroeconomic volatility in the US. It was explicitly referenced in a 2004 speech by Ben Bernanke prior his succeeding Greenspan as Federal Reserve Chairman. It was implicitly referenced by former Bank of England Governor, (now) Lord Mervyn King in speeches in 2003 and 2004 describing a similar phenomenon in another advanced economy of non-inflationary and consistent expansion (above trend growth, falling unemployment and low and stable inflation) over the preceding decade. Not only does the period coincide with monetary policy conducted by independent central banks and structural shifts in economic structure supported by advances in technology, these reference points occur just prior to the period of period in which our analysis is focused

[25] As well as slow-balisation – exemplified by re-shoring, near-shoring and friend-shoring in terms of supply chains

Africa (SSA). So, in this emerging multipolar, shock prone, geopolitical landscape what can explain equity price premiums in Africa.

In this paper, we use a monthly time series dataset of real and financial variables to assess the response to shocks of equity markets in 11 individual African countries[26], within constructed regions that mine the unique differences of the structural basis of economies, industrial strategies and policies and capital markets. Our approach is taken with the intention of exploiting the relevant continental and sub regional dynamics to study the intersection of financial markets and geoeconomics. We define event windows, within our sample period between 2003 and 2018, from which we track the transmission effects of exogenous shocks from specific key economies to a specific, African financial market variable.

Our hypothesis centres on determining the degree to which the concentration of an underlying stock market index might the interact with the structure and complexity of a countries economy amidst certain regional dynamics[27] to affect market performance and resilience. The more complex a country is, and regionally and globally integrated, the more resilient it could be. But where on the continent a country is located, and which regional economic communities, plural, it participates in also play significant roles. The cultural and historical ties between the Middle East and North Africa are a key distinction from the geographical and historical relationships Sub Saharan African countries have. But North Africa is not homogenous in its global or regional relationships despite facing similar cultural and political events, like the Arab Spring. For instance Morocco has long and strong commercial ties to Europe, whereas Egypt is intimately involved in the diplomatic affairs and disputes of the Gulf and Levant regions.

While the Sahel region, stretching from the Atlantic Coast to the Red Sea, sits between North Africa and SSA, there are also a number of land-locked countries in the central region of the continent, sometimes referred to as Middle Africa. For reasons of data paucity, primarily given the size of financial markets in the both the Sahel and Central Africa sub region, we do not include them in our analysis. Also, 5 of the 8 countries in the Sahel region have experienced coup d'etats since 2020, some countries more than once during the period.

There are a number of overlapping memberships among the eight African Union recognised[28] regional economic communities (RECs) held by countries, in addition to regional

[26] Broadly, by region; Southern Africa BWA, NAM, ZAF, ZMB – West Africa ; GHA, NGA – East Africa; KEN, MUS – North and French West Africa; CIV, EGY, MAR

[27] We calculate a measure of index concentration by summing the weights of the top five equities within each of the local stock indexes. This allows us to compare both relative levels of concentration and industry representation in absolute terms, among those top five equities and between each of the underlying local stock indexes, relative to structure of the real economy (sectoral shares) in underlying countries.

[28] By treaty

economic cooperation or development bodies, customs unions, and indeed monetary zones and shared currencies they may also participate in or lead.. The Economic Community of West African States (ECOWAS) REC somewhat binds 11 countries in English and French West Africa with parts of Central Africa. The Common Market for Eastern and Southern Africa (COMESA) brings together 21 countries From North, East and Southern Africa. A number of the countries within the East African Community (EAC) are also members of COMESA as well as the Economic Community of Central African States (ECCAS). There are 14 countries using a version of the CFA Franc, the Central African CFA Franc (XAF) is issued to the 6 countries in the Economic and Monetary Community of Central Africa (CEMAC) and the West African CFA (XOF) is issued to 7 countries that are also members of ECOWAS. COMESA also includes countries in the Common Monetary Area (CMA) anchored by South Africa and its currency the Rand (RND). ECOWAS is somewhat Atlantic-facing is some respects while COMESA tends to looks a bit more eastward, or has.

Much has been made of the influence of China, and other state actors, on the economic and political dynamics of continent. In terms of trade and investment, whether the purchase of strategic commodities and/or financing infrastructure projects the bilateral relationship has grown but is biased to debt. The figure below shows the progression of aggregate loan commitments from China (both from state and state-owned enterprises and financial institutions) from the point at which China joined the WTO to 2017. There are notable peaks in 2013 and 2016, before returning to a pre 2012 trend that maps to the initiation of the Belt and Road Initiative. We derive further insight from the patterns and quantum of borrowing by individual countries.

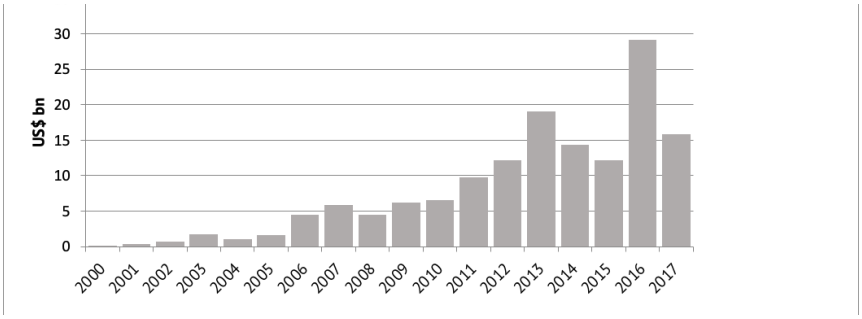


Figure 2.1 : Chinese Loan Commitments to Africa 2000-2017

Note: This figure shows the amounts borrowed by African countries from Chinese entities. The source of the data is the Johns Hopkins SAIS China Africa Research Initiative

Between 2008 and 2017 the USD value of Africa-US trade fell 60% (from $100bn to $40bn), through most of that period the value of intraregional trade was lower than the value of Africa-EU trade. However, using data from the IMF Direction of Trade Statistics database we can measure the changes in total trade value[29] between Sub Saharan African countries, in aggregate, and their

[29] Total trade from the sum of X+M, where X is the free on board (FOB) export values and M is the total of import costs, insurance and freight (CIF) in USD

trading partners between 2000 and 2021 to make some notable observations. While the share of SSA's total trade with the Middle East grew slightly, from 4%-6%, the overall share of trade with advanced countries grew even more significantly during this period, from 6% to 36%. However, the share of SSA's total trade with China and US went in opposite directions, with China capturing 18% of SSA trade, up from 5%, at an annual growth rate of 13% compared to the US falling from 17% to a 5% share of SSA trade.

Drilling down into the key challenges on the economic, monetary and financial horizon is the balancing of national policy choices concerning domestic and international competitiveness, formal employment, industrialisation[30] and trade strategies with national commitments to regional integration embedded in the process of operationalising the African Continental Free Trade Agreement (AfCFTA) in 2021. The intended progressive liberalisation is based on an open, rules based, transparent, inclusive and integrated single market in goods and services. But requirements for new regulatory frameworks will test existing institutional capability, in part because it implies pooling some measures of sovereignty.

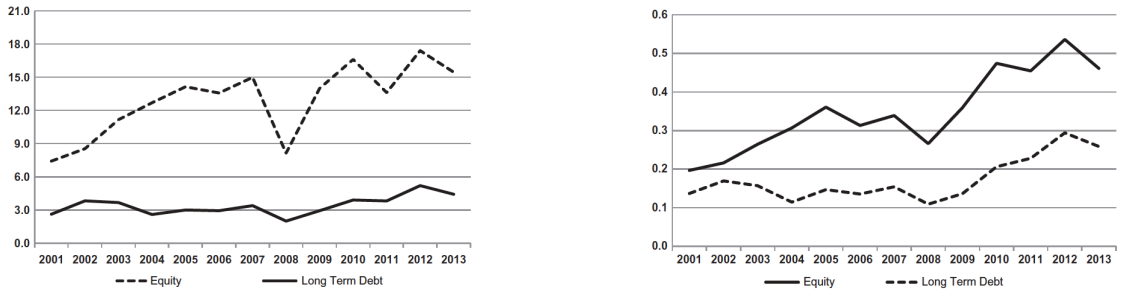
The current state of asymmetric integration with global markets and between regional markets has ensures regional economic resilience is of significantly increased importance to the future of the continent. The process of operationalising the African Continental Free Trade Agreement (AfCFTA) that began in January 2021 offers a unique set of institutional conditions in which to pursue that goal. The potential for regional financial integration to increase intracontinental trade[31] and stimulate formal domestic activity can still pose a range of institutional challenges if maintaining and increasing openness to global financial integration is desired.

Policy considerations need not debate whether globalisation reached a tipping point prior to 2020 or the Covid19 pandemic is an accelerant of a deglobalisation trend. From a geo-economic perspective, there is a pressing need to contemplate continental approaches to the technology dimensions associated with the re-emergence of a great power competition, where the continent is a secondary arena of engagement. From a macro-financial perspective, it is crucial to focus on channelling investment to key sectors and accelerate the growth of specific asset classes in Africa. Specifically, increasing the provision of equity financing options for the continent's SMEs is of systemic importance.

[30] For instance, differing choices for structural transformation, economic development and perspectives on emergent opportunities could see countries target policy efforts more toward manufacturing ('Factory Africa'), technology and services ('Silicon Savanah/Lagoon') or agriculture ('World's Grocery Store')

[31] The $USD value of Africa-US trade in 2017 (c. $40bn) was 60% lower than in 2008 (c. $100bn), while the current value of intraregional trade remains lower than the value of Africa-EU trade

The capital account generally and financial flows specifically matter for the global competition for risk capital EMDEs are engaged in to support their future growth of their economies and financial ecosystem. Figure 2.2 below, originally in Lane (2016) uses data from the IMF Coordinated Portfolio Investments Survey to examine capital flows, allowing us to easily observe a severe dip in the share of Equity category for Sub Saharan African external liabilities in 2008 relative to the Long Term Debt Category.



(a) SSA External Portfolio Liabilities to reporting countries (b) SSA Share in Global Cross Border Portfolios

Figure 2.2: Portfolio flows to Sub Saharan Africa 2001-2013

Note: This figure illustrating equity and long term debt portfolio flows to Sub Saharan Africa has been reproduced from Lane (2016) and utilises IMF Coordinated Portfolio Investment Survey data. The left panel (a) shows SSA external liabilities to reporting countries and the right panel (b) shows the SSA share of global cross border portfolios

We can also observe the difference and trend in the shares of global cross border portfolios of SSA Equity and Long Term Debt. Where Long Term Debt rose from 2001 to 2005, with a sharp reduction in 2008 before rising to a peak in 2012, the gap to the share of Equity began slightly higher but widened over the period. The SSA share of Equity in global cross border portfolios remained effectively constant with a slight negative bias, reaching a low in 2008 before also peaking in 2012. The management of the capital controls has a role in competing for capital. Klein (2012) offers a salient description of the two types of capital controls worth considering alongside the observations we make above on aggregated data. A critical distinction is made between long-standing controls on a broad range of assets (walls) and episodic controls that are imposed and removed, and tend to be on a narrower set of assets (gates).

The remainder of this paper will proceed as follows; in section we present an extension of our model within a contextual narrative, in section 3 we review the relevant literature influencing our analytical priors and that underpin the development our model and methodological approach, in section 4 we describe our data, the empirical setting and the scenarios in which we use a range of econometric tools for our analysis, in section 5 we discuss the results from the analysis described in the previous section and section 6 we conclude.

2.2 Extended model extension and Hypothesis

In this section we present the hypothesis derived from our research questions and the model we extend to develop our conclusions.

Having taken note of an emerging multipolar world, and the role of financial markets as a vector for the transmission of shocks from Developed Markets (DM) in Advanced Economies (AEs) to Emerging and Frontier Markets (EFM) in Emerging and Developing Economies (EMDEs) during the GFC, we consider specific implications for Africa. Have financial markets assets in Africa, specifically public equity, become more resilient at a country, regional and aggregate level over time. If so, what has determined or shaped market resilience and if not, what can or should be done to foster or catalyse it. We formally state our null hypothesis below;

H1: Market resilience in Africa does not vary at the country-, regional- or aggregate-level

So, to estimate which of the monetary policy interventions, changes in risk appetite and/or liquidity or drivers of growth drivers impact changes in equity indexes in specific key economies to our set of African countries, we use a two-stage process. First, we make use of multiple dummy variables representing a set of characteristics to estimate linear regressions as a framing exercise. Second, we utilise informed group identifications to analyse numerous sets of impulse response functions and forecast error variance decompositions to trace patterns that have possible value to guide both policy makers and investors.

Our model begins with the following intuition, where if;
$\mathbb{E}(\ asset\ prices) \int (\ risk\ sentiment,\ liquidity\ and\ growth)\ can\ also\ expressed\ as -$
$\mathbb{E}(changes\ in\ asset\ prices) \int (\ changes\ GFCy\ and\ growth)$*, we must account for both endogenous and exogenous aspects of liquidity and growth*

To consider the endogenous components of local asset price behaviour we look first to understand the structure of the real economy in individual countries from which the asset prices reside. Over and above differences in the relative sizes of local capital market and economies, and before the influences of history and geography on development, the issues of existing economic structure and the evolution of economic complexity can also matter in various ways. Economic complexity in production and trade terms is based on settled facts rooted in the theory of gains from trade to individual countries. But the practical fact of the what goods and services a country buys and sells is only a general consideration absent the quantity (let alone value). More specifically, the proportion of trade made up of domestic production (versus domestic consumption) can indicate integration to (and reliance on) global value chains. The effect of differences in this respect may vary more for countries further on the periphery of global economic

power than those closer to the centre. The competition between centres of economic power may therefore be a supplementary influence on this dynamic.

We therefore use the net export term, extracted from expansion of the general GDP identity below, to analyse, with some granularity, if and how the patterns of external trade changed within our sample period for each country:

$$GDP_{i,t} = c + i + g + nx$$
$$GDP_{i,t} = c + i + g + (\boldsymbol{x} - \boldsymbol{m})$$

where;

c = private consumption + I = gross investment + g = government expenditure + nx = net exports, (x – m) = (exports – imports)

With data from the Atlas of Economic of Complexity we identify (by value and share of GDP) the top two exports and top imports in each of the 11 countries in the years 2003 and 2017. In combination with data from the IMF Direction of Trade Statistics database, from a longer period over laid on our sample in the years 2000 and 2021, we are able to build a picture of the size and infer the potential scope of structural changes in the underlying economies as they evolved during the sample period.

Despite the significant export contribution, as measured by the value of the top 2 exports, of a range of resources (precious metals, agricultural and oil in the form of unrefined crude) to certain countries, we note the prevalence of refined oil as the top import to a range of countries in 2003, including the major exporter in the sample. In 2017 a very different picture emerges with the only country that still has refined oil as the top import is also the major exporter of unrefined crude. Our segmentation, using the BIS classifications combining the resource (including precious metals) exporting group of countries with oil exporters to contrast with more or mostly diversified economies creates an analytical challenge.

First, we have to be mindful of losing sight of the agricultural commodities produced for sale and export, both on the continent and globally with this segmentation approach. Second, we need to be mindful of the countries whose major exports were services in either 2003 or 2017. There are countries in the sample whose largest exports moved between the two period from a combination of an agricultural commodity and a service to a precious metal and a service or from a service and an agricultural commodity to precious metals. This confounds the segmentation approach by simple combination of the classifications.

The application of the insight above is important for the expected signs for the relevant coefficient when we extend the model into the first iteration of a linear specification:

$$\Delta y_{i,t} = \alpha + \beta \Delta VI_{k,t} + \theta \Delta LR_{k,t} + \lambda \Delta X_{t-1} + \mu \Delta Y_{t-1} + \varepsilon_{i.t} \quad [2.1]$$

where;

$\Delta y_{i,t} = monthly\ change\ in\ logreturns\ of\ local\ stock\ index\ (lsi)\ of\ each\ country_i$
$\beta \Delta VI_{k,t} = monthly\ change\ in\ volatility\ index\ (vi)\ of\ each\ key\ centre\ country_k$
$\theta \Delta LR_{k,t} = monthly\ change\ in\ effective\ liquidity\ rate\ (elr)\ of\ eack\ key\ centre\ country_k$
$\lambda \Delta X_{i,t-1} = a\ vector\ of\ the\ lagged\ monthly\ \%\ change\ in\ a\ country\ specific\ variable$
$\mu \Delta Y_{t-1} = a\ vector\ of\ the\ lagged\ monthly\ \%\ change\ in\ global\ variable$

The range of variables that could be selected for the country-specific vector include financial variables and the range of variables that could be selected for the global vectors includes real variables. This included a country specific choices of key exports or imports (adjusting the sign as appropriate) alongside industrial production measures as growth proxies, for the world, the relevant sub region and for key economies. This could allow us to control for growth to an extent, and other fixed effects.

Our initial objective for this process was to identify, ideally, a single most appropriate (explanatory) equation per country to use as the basis of country by country approach to linear regression. Applying a threshold level goodness of fit, comparing R^2 to ranked equations and then choosing based on information criterion (AIC, BIC), assess 174 regressions. We discard a number of variables but extend the linear specification to include potentially two additional endogenous terms to the equation the change in the asset price in the prior period (t-1) to capture its influence on asset price in the current period(t) in preparation for estimating a panel VAR.

$$\Delta y_{i,t} = \alpha + \Delta y_{i,t-1} + \beta \Delta LFC_{i,t} + \beta \Delta GFCy_{k,t} + \lambda \Delta X_{i,t-1} + \mu \Delta Y_{k,t-1} + \varepsilon_{i.t} \quad [2.2]$$

where;

$\Delta y_{i,t-1}\ is\ the\ prior\ period\ change\ in\ logreturns\ of\ local\ stock\ index\ (lsi) of\ each\ country_i$
$\beta \Delta LFC_{k,t}\ is\ a\ measure\ of\ local\ financial\ conditions\ in\ each\ country_i$
$\beta \Delta GFCy_{k,t}\ represents\ the\ global\ financial\ cycle\ variables\ of\ the\ each\ key\ centre\ country_k$

The measure of local financial conditions as a result of local policy considerations (local monetary policy rate) and outcomes (realised inflation) is an ex-post hypothesised value we generate, whereas the global financial variables we use follows the literature, primarily the VIX for the volatility index as proxy for risk appetite and US Federal Funds Rate as a proxy for the liquidity rate. But we maintain the use of variants from key centre economies we hypothesise can have unique or significant influence on behaviour of the price series in our sample. We estimate a set of panel regressions using dummy variables to represent structural characteristics

Below we describe the primary variables used for coefficient estimations with a series of panel vector autoregressions (pVAR) to test our hypothesis.

Our primary impulse variable is change in risk appetite via changes in the liquidity rate and the change in volatility index in in each of our proposed key centre economies. These are the US, the Euro Area and China. We also utilise the global common factor for risk assets presented initially in Miranda-Agrippino and Rey (2015) and updated and the data made available in Miranda-Agrippino, Nenova and Rey (2020). We deploy up to another five impulse variables that represent the real economy as monthly proxies for economic growth; including industrial production figures for each of our three key centre economies, one of six specific regional industrial production figures overlapping the continent, those adjacent to growth, the local currency exchange rate to the USD and Euro, one of eight resource, precious metal and agricultural commodities.

Our primary response variable is the log change in local asset prices via changes in the local stock index prices, initially at the aggregate level of our 11 country panel using a system of country specific equations. Next, we constructed panels of sub samples of countries identified by a combination of structural features and characteristics and make comparisons from linear panel regression coefficient estimates to identify further patterns. From our sample of countries, we then construct an initial three geoeconomic zones, and finally combine two of the three. Last, at the level of individual countries, we explore two cases we loosely define as quasi natural experiments. The first compares the response of alternative price series from the same country, (an overall index that includes a significant number of cross listings against an index consisting of primary listings only). The second compares the response behaviour in similar price series from two different countries with a common export feature (both dominate global markets in the same key commodity).

We first predict the orthogonalized impulse response functions (OIRF) for a still quite large number of variables setting broad specifications for the full panel. We then predict a set of impulse response functions (IRF) with more varied specifications, to improve stability of the system and aid interpretation. Remaining variables must be appropriate to the information we hope to garner from the sub sample groups identified by geoeconomic zone using a General Method of Moments (GMM) estimation approach. We systematically compare the behaviour of our response variable to one unit shocks to wide range of impulses, tracing the impact through each system to try and identify patterns and anomalies. We hope to use these patterns to highlight explanatory structural features and inform policy considerations. But most importantly, we isolate the factors that demonstrably contribute to or detract from explaining how the return on local stock indexes have behaved through the sample period and during a set of event windows we describe in the section following the literature review.

2.3 Literature Review

In this section we discuss the relevant literature that has influenced both our analytical priors and methodological approach. We also highlight specific conclusions drawn in the literature that inform some parameters in our analysis and also frame our expectations. We identify and focus on three broad areas of the literature that have overlapping themes with relevance to our hypothesis.

In the following sub sections, our discussion of the relevant literature has been arranged in three broad themes, following a brief exposition on the core theories framing our primary perspective. Global financial cycles and risk premiums is linked to structural features under the headline of institutional and regional dynamics, which are in turn linked to the role of economic complexity might play for countries in the region navigating the interaction between geo-economics and financial markets.

2.3.1 Core theoretical frames

Our primary perspectives on these challenges are viewed through a number of academic frames – first, within the constrained policy choice set, known as the impossible trinity in macroeconomic analysis, the open economy trilemma first advanced by Mundell (1960) and Fleming (1961) – where countries must choose to optimise two of monetary policy independence, exchange rate stability and capital mobility. We then add another perspective, that is the paradox of globalisation, an augmentation to the standard trilemma advanced by Rodrik (2000) as the political economy trilemma – where countries must contemplate the trade-offs in attempt to optimise policy direction choices between two of globalisation, national sovereignty and mass democracy.

The political economy trilemma is inherently governance oriented, but uniquely so for Africa given the state of both industrial and financial market development. Considering what matters for financial development, Chinn and Ito (2006) drew links between capital account liberalisation, legal and institutional development and financial development (in equity markets in particular). Using data for a 108 country panel between 1980-2005 they derive tests to answer 3 core questions of particular salience to Africa and our research interest. First, whether financial openness leads to equity market development. Second, whether the opening of goods markets is a precondition for financial opening. And finally, third whether a well-developed banking sector is a precondition for financial liberalisation and related, whether bank and equity market development are complements or substitutes.

Aizenman and Ito (2011) approach the governance framing of the political economy trilemma from a measurement perspective, developing indexes to gauge extent of attainment of the three factors for 139 countries between 1975-2016. Their study of the validity of the political economy trilemma hypothesis involved testing for a linear relationship between the three variables, and found the following evidence. Developing countries do have a trilemma in that all three variables are linearly related. However, industrialised countries, having consistently attained the highest level of democracy, have a dilemma, as the only linear relationship is between globalisation and national sovereignty.

With a singular focus on our unit of analysis, we are captivated by the implications of the global financial cycle (GFCy) identified by Rey (2015) and aggregate risk appetite and liquidity for specific asset prices in Africa. On the one hand, we see the critical macro-finance (CMF) view offered by Gabor (2020) describing the spread of financial globalisation and market-based finance systems as dominated by the US and the US dollar as a potentially critical influence on how this phenomenon has played out in Africa over time. But on the other, Miranda-Agrippino, Nenova and Rey (2020) provide compelling study of the distinct contrast in the transmission channels of monetary policy from China and the US, despite the sizeable impact of both on the global economy. As opposed to propagation through financial markets, with significant responses in financial conditions, risk indexes, asset prices, private liquidity and international capital flows, the transmission of Chinese monetary policy is mainly through international trade, commodity prices and global value chains.

They suggest that key to of the international transmission of Chinese monetary shocks likely reside in its large relative weight in world production. But to parse why the channels differ they compare and map the trade and financial links between the US and China, visualised with network graphs. The data underpinning the trade network graphs are based on export data only given their suspicions of import data due to issues of misreporting. The financial network graphs are based on CPIS data. This results in an illustration of the US and China as equals in the global trade network. They are also highly interdependent, to the extent that together they form the largest network community. European countries make up the second largest group. But their analysis also illustrates they are far from equals in the global financial network. The US definitively and demonstrably dominates the portfolio investment network with linkages to financial centres including the UK. China is negligible even in comparison to financially developed European economies that make up the second largest network community.

2.3.2 Global financial cycles and risk premiums

Within recent additions of the literature demonstrating a degree of consensus on the existence of a global financial cycle (GFCy) there is an acknowledgement of its roots in the open

economy trilemma. But specifically, there is a thickening vein of research, following Miranda-Agrippino and Rey (2015), investigating nexus between monetary policy, risk taking and asset prices on a global scale. But looking forward as a momentary digression, we consider the general ideas advanced by Brunnermeier (2020) on the digitalisation of money and future monetary arrangements as likely to be instructive in determining choices from an interesting array of future policy options.

We first note that assets listed in emerging and frontier markets, from emerging and developing economies, are perhaps not as richly represented in the data commonly used. But we also note that Jorda et al (2019) sought to address some prior gaps by analysing global financial cycles with long run data over 150 years in 17 advanced economies. Their investigation revealed a number of critical features on which we build. The prevalence of financial cycles across countries lends credence to a global financial cycle, and where the financial synchronisation has tended to be observable across borders through the synchronous behaviour of real variables like GDP and investment, equity prices have displayed a different pattern.

The exploration by Miranda-Agrippino, Nenova and Rey (2020) of the global footprints of monetary policy revealed some notable developments and interesting findings. Most important, is the updated global common factor from risky assets data to reflect changes in the composition of global markets. Chinese equities are now included, though no material change to African equity representation. Related and quite importantly, they also found the role played by the VIX, as a barometer of global risk, has changed since the GFC. Third, they tested the influence of China v US with network analysis. US and financial centre and affiliates (the 5 Eyes/Anglosphere countries, UK ,CAN, AUS, NZ as well as to a degree, western, southern and northern European countries still dominate finance vs CHN and a smaller contributing[32] cohort of affiliates. Fourth, wider Chinese influence is evident, however, through the real channel and with a longer lag than the impact of US monetary policy. And finally, since Bretton-Woods, the dominance of the USD as global reserve currency remains the unfettered despite changes in the distribution of USD holdings as foreign exchange reserves over recent decades[33]. It was still 62% of global reserves as of 2019 (having been above 70% prior to 200) and thus remains a separate, unique and strong channel.

The importance of exchange rates is prevalent in the literature, as is emphasised by Jorda et al (2019), as a natural transmission channel of risk appetite. But this also highlights the possibility of differences in that transmission depending on the exchange rate regime in effect in a particular country. While the classification of exchange rate regimes found in Ilzetski, Reinhart and

[32] By economic size

[33] Prior to 200 the Euro was under 20% of global foreign exchange reserves, peaked above 30% in 2010 and settled around 21% in 2019, Sterling was stable at around 5%, and Yen was in the of 6-7% until settling at 5.5% in 2019 while the Chinese RMB was still under 2% in 2019. Source: IMF Currency Composition of Official Foreign Exchange Reserves (COFER) database

Rogoff (2017) is extensive and includes the differences between the de jure regime and de facto regime, the binary distinction between fixed and floating regimes is in reality even more simple in Africa during our sample period, and in our sample – all have versions of fixed exchange rates, managed floating at best, with one episodic period of a de facto freely falling exchange rate.

2.3.3 Institutional and Regional dynamics

2.3.3.1 History (might) matter for institutions

Investigating the larger questions of the fundamental causes of variation of income per capita across countries Acemoglu, Johnson and Robinson (2001) sought to test the degree to which institutions may matter. They found that the type of colonisation mattered, describing a continuum from extractive to inclusive, and suggested that for the 'colonial state' the institutions it created by and during, persisted after independence. This theory complements and extends the literature of La Porta, Lopez-de-Silanes and Shleifer (2008) and others who point to a high correlation between historical legal origin of a country's laws and economic outcomes when considering governance issues like property rights and other legal protections valued by firms and investors. In their further work, Acemoglu and Johnson (2005) concluded there was considerable evidence that economic and financial outcomes were determined in large part by institutions.

The literature on how politics can exert influence on economic outcomes highlighted by Acemoglu (2005) discussing weak and strong states stresses the contrast between politically strong states (the ability to change a leader easily) and economically strong states (the ability to raises taxes) is particularly salient to countries in Africa since independence. Acemoglu (2005) also considers questions of original institutional design in the historical context of the developing countries, and the long run effects of specifically, extractive institutions, in addition to the effects of legal origin.

This links back to the work of La Porta, Lopez-de-Silanes and Shleifer (2008) highlighting the apparent consequences for GDP of historical legal origin. Globally, countries globally with English legal origin have had higher GDP performance than countries with French legal origin. Elsewhere in the literature on the relationship between historical legal origin and growth and development Assane and Malmaud (2010) examined those dynamics within the group of SSA countries with French legal origin. The differential impact they found indicated the constraints of currency union membership tended to hinder financial development. This was in addition to the negative impacts of French legal origin they also confirmed. We find this noteworthy in the context of the geographic location of 2 regional stock exchanges in Africa, their respective histories.

Our data set includes a price series from one regional exchange, the BVRM, located in Cote d'Ivoire. But excludes excluded the other regional exchange the BVMAC, now located in Cameroon.[34] Though they both serve regions that have historically used a version of a CFA Franc, with a similar monetary anchors it has notably been in separate monetary groupings - UEMOA/WAEMU in West Africa and CEEAS/ECCAS (and CEMAC)[35] in Central Africa. But significantly more of the 54 countries on the continent there are significantly more with French legal origin, notwithstanding the over-representation of English legal origin countries in our sample.

Stocker (2005) explores another institutional dimension of politics in the relationship between equity returns and freedom. He details 5 components - size of government, legal structure and security of property rights, access to sound money, freedom to trade internationally, regulation of credit labour and business – changes in which can affect equity prices. This occurs via the impact on future cash flows and the discount rate. Higher economic freedom reduces uncertainty, which lowers the discount rate and increases future cash flows. We consider exploring an adjacent concept quantitatively using the annual Freedom House Democracy Freedom Status (DFS) variable, but our time series is a pure monthly dataset.

Stocker (2016) returns to the concept with a quantitative approach with an additional focus on crisis periods. He uses fixed effect regressions on annual panel data for 69 countries (including 11 African countries) between 2000 and 2010 to investigate the relationship between changes in an economic freedom index, and a number of different types of crises and equity returns. Following findings in the literature that crisis is an explanatory variable of significance for structural reform he is able to draw certain conclusions from his investigation. The assertion is that crisis does not facilitate liberalisation per se but policy change, insofar as crisis events are a window of opportunity in which economic policy adjustments can be made, and those changes may impact on the level of economic freedom in said country.

There are 5 different crises he describe as observable and can be approximated to a specific dates, that can be defined in two ways, with credit to Reinhart and Rogoff (2009). Those quantitatively defined are currency (+15% annual depreciation) and inflation (+20% annual threshold) crises -qualitatively defined include debt, banking and political crises. We note all have

[34] At its founding in 2003 it was located in Libreville, Gabon but is now located in Douala, Cameroon after merger with the Douala Stock Exchange in 2019 (agreed 2017). Serves 6 countries; Cameroon, Congo, Gabon, Equatorial Guinea, the Central African Republic and Chad it does not meet our data thresholds on a number of measures

[35] CEMAC stands for the Communauté Économique et Monétaire de l'Afrique Centrale in French, while in English, it is known as the Economic and Monetary Community of Central Africa States.
ECCAS stands for the Economic Community of Central African States, but the acronym CEEAC for its name in French, the Communauté Économique des États de l'Afrique Centrale is also used for its name in its other working languages, Portuguese and Spanish.

particular relevance for the African countries in general, some for specific countries in our sample during our sample period.

Using a framework to designed to study both crisis and non-crisis episodes as well as trends and bursts in spillovers, Diebold and Yilmaz (2009) analyse nineteen global equity markets over a 15 year period between 1992 and 2007. Interestingly, they found striking evidence of divergent behaviour in the dynamics of return spillovers vs. volatility spillovers. In particular, volatility did not display a trend but well-defined bursts associated with readily-identified "crisis" events. Returns, however did not display bursts, but did exhibit a gently increasing trend. This was associated by the authors with the gradually increasing financial market integration in the fifteen year period analysed.

2.3.3.2 Geography (could) matter for growth

The pattern of political, economic and financial globalisation through the twentieth century to the present drove increased trade linkages between global counterparts and African countries to varying extents and between African countries to a different degree, yet during the same period EMEs were developing into a recognised asset class[36]. This implications of that recognition are subject to multiple interpretations. A notable interpretation was discussed in a investigating the implications arising from the evolving perceptions of international monetary policy for the global economy and the importance of economic fundamentals dependant on the source of the shocks. Ahmed, Couilibaly and Zlate (2017) found that during the pre-2000 period when EMEs were seen a single asset class, investors did not necessarily differentiate based on economic fundamentals during crises periods of the time. However, over the following decades they did find evidence suggesting differentiation was progressively increasing, beginning with the GFC through each following crises periods, through time.

Because a large portion of African global exports to the rest of the world is quite skewed to low value added natural resources including crude oil, perceptions of commodity-driven economies have evidence. The share of low value added exports of Africa's total exports to the rest of the world actually began to grow in 2003. However, the potential for wider export-driven industrialisation lies in the opportunity for trade integration on the continent, and within the continent because intra-regional exports contain significantly more value added goods.

Total trade between the US and Africa had represented the largest share of Africa's total trade in 2008, but following the GFC by 2016 the value of US-Africa total trade had fallen significantly. Enough for the value of Europe-Africa trade to represent the largest share during

[36] In truth, emerging market debt (EMD) had more purchase as a recognised asset class, or did so earlier

those 8 years, before intra-African trade represented the largest share of Africa's total trade in 2016. In the four years prior, the value of manufactured goods exports within Africa were double the African exports to the rest of the works. At the same time, industry and manufacturing…But levels of trade and financial Integration within sub-regions in Africa continue to vary. The East African REC, the East African Community (EAC) engages in the most intra-African trade, followed by WAEMU/UEMOA in West Africa and the Southern Africa Customs Union (SACU). The EAC also is the most integrated sub-region with the highest level of trade between countries within the EAC, but closely followed by the Southern Africa Development Community (SADC).

Analysis of Sub Saharan Africa (SSA) between 1995 and 2014 by Calderon and Boreaux (2016) notes SSA generally witnessed strong growth during the period, characterised by more instances of growth accelerations into the global financial crisis, on average near 5% and in a low inflation environment with "adequate" monetary policy space was accompanied by improvements in trade and financial openness and political institutions though only marginally across institutional frameworks. Growth per capita stopped widening relative to the industrial world and in fact other developing economies around the start of the millennium, but also peaked in 2008, the year of the global financial crisis.

Debrun, Masson and Patillo (2011) conducted an empirical investigation of monetary integration in Africa and began by noting the continent has the most countries and the most currencies, but it does also have two monetary integration arrangements that have remained in place. The CFA franc zone, which in part provides a justification for the regional exchange in Cote d'Ivoire, and the Common Monetary Area in Southern Africa, which we expect explains some co-integration between South African capital markets and the other countries in the zone in our set. Though building on the literature on optimal currency areas (OCA), their cost-benefit approach to calibrating and developing a gravity model highlights the benefits of a lower inflation bias and the prospect of importing increased credibility from monetary integration, but also points to support for trade that may synchronise domestic business cycles.

While the link between exchange rates, trade and growth remains notable, there has been limited progress on any African Union currency projects initiated in previous decades. The emphasis has been on the efforts to mitigate growth divergence. However, of projects existing contemporaneously to Debrun, Masson and Pattillo (2011) the net welfare benefits of further monetary integration were limited to those in South, West and East Africa. We consider insight from their results as a potential indicator of the clear value of regionalisation in capital markets in Africa, and perhaps charting a path. Not least in the context of a future global financial architecture that is already making increasing use of digital infrastructure for trade. The description in Brunnermeier (2019) on the prospect, viability and value of digital currency areas (DCA) is an area of further adjacent research.

2.3.4 Economic complexity and political economy dimensions

In this sub section, we explore dimensions of economic complexity and political economy that are relevant to the direction, source and timing of financial flows (trade and capital).
While geography certainly matters, complexity does as well. Hausman and Hidalgo (2011) delve into the network structure of economic output to define and analyse economic complexity. The definitions they introduce on the topic of complexity includes two inversely related components, diversity and ubiquity. Complexity in itself can reflect the knowledge required to manufacture a given product. Economic complexity refers to the diversity (number and variety) of products a country has to produce (, consume) and export. The diversity of products interacts with the ubiquity of a product, defined as the number of countries that make such product.

Where economic growth in Africa has been driven by the primary sector, the consequence has been a lack of inclusivity meaning inequality remains huge challenges in the continent. But that also means it has been detrimental to the industrial sector, particularly manufacturing. In the fifteen years to 2011, approximately three quarters of their exports did not necessitate any advanced technology, constituting less than 3% of exports. In their words, African countries exports are not diversified but are ubiquitous. Hausman and Hidalgo (2011) also found the most complex economies in Africa then included many small islands while the less complex economies were oil or gas rich countries. We take of note of this in terms of the BIS classification we employ, of resource and oil exporting countries against "more diversified" economies. But we also take note of diversification playing an important role in the process of structural transformation.

Simoes and Hidalgo (2011) developed an analytical tool to measuring economic complexity. The underpinning work relied on considering the intellectual resources deployed and knowledge base required in production in combination with the diversity of products exported. The economic complexity index (ECI) they developed[37] measures the degree of complexity that hinges on the value added components of production. Across a large panel of countries economic complexity, as measured by this index, was found to be positively correlated with GDP per capita. In the appendix we use a series of maps charting the global evolution of economic complexity and country rankings through time – 2003, 2008, 2010, 2017 and 2021. This map series, using the ECI Trade rankings, very clearly illustrates 3 points to us - the low aggregate ranking of the continent, the variable country coverage focused in the centre of the continent, and the changes in regional rankings in economic complexity.

In another study undertaking to analysing the productive structures and the degree of the economic complexity of African countries, Yameogo, Nabassaga, Shimeles and Ncube (2014) add

[37] See the Observatory of Economic Complexity

the notion of sophistication for consideration in the economic complexity equation. Following a path set by Hausmann and Hidalgo (2011), Yameogo et al (2014) generated a large dataset with variables including diversity, ubiquity, the economic complexity index of each African countries and, as a proxy for sophistication, technology intensiveness. The concept, originally introduced in Lall (2000), refers to the ability of an economy to make some improvements over time and achieve economies of scale while also accounting for innovation through research and development (R&D). By classifying the exports of African countries by their technology intensiveness, they confirmed that most specialised in the export of unmanufactured products that do not require significant advanced technology or are based on low technology manufacturing processes.

2.4 Exploring layers of the empirical landscape, through comparison, scenarios and quasi-natural experiments and event windows

In this section we describe the landscape and setting for a number of dimensions on which we explore scenarios. We also present the data we have collected and use to compare the structural characteristics influencing the differing responses of risk asset prices in regions and countries through a range of event windows and time period selections within our sample period.

We first make some broad observations that offer evidence of heterogenous equity market resilience with comparisons between aggregate benchmark regional indexes, and between countries. Peak to trough recovery periods of differing lengths for individual local stock market indexes within the panel sample, in nominal local currency prices terms, are illustrative. The local stock market index price series we use for South Africa had recovered to its 2008 high by 2010 and then subsequently moved significantly above that level. However, neither index we use for Nigeria or Morocco had recovered to its 2008 high level during the sample period (though both did in late 2021). Egypt is considerably above its 2008 high, but that is a relatively recent development, occurring just outside the sample period in 2018.

The index we use for Kenya also remains below its 2008 high, though it came close to that level in 2015. The index we use for Namibia surpassed a high reached in late 2007 by 2013. The index we use for Botswana also hit an earlier peak in 2007 and then in 2008, which was not surpassed until 2015. The index we use for Zambia had returned to its 2008 high in 2013, and made new high in 2014. The index we use for Mauritius had recovered to its 2008 high by 2011, set new highs in 2014 and 2016. The regional index based in Cote d'Ivoire we use had recouped its losses from its 2008 high in 2014, set new highs in 2016 but was back below the 2008 level in 2018. Finally, the peak level of the index we use for Ghana did not come until 2014, which was then surpassed by a new high in 2018.

For comparative context, the MSCI EM Local Currency Stock Index did not reach its 2007/8 high before the end of our sample period (2017m6). However the MSCI Emerging and Frontier Markets Africa USD Index did exceed its 2007/8 peak in 2011, making a new high level in 2014. The number of persistent high volatility episodes, as measured by the VIX, during our sample period is also instructive. Between 2001 and 2004 the VIX traded above the 20 level for more than 200 days, between 2005 and 2009 for more than 300 days, and between 2010 and 2015 for more than 100 days twice.

The next step in our analytical approach is to ponder the landscape in which we can generate scenarios relevant to our hypotheses. We start by identifying key event windows that utilise a number factors. In addition to changes in the global macro-financial environment and country-specific structural institutional and market reforms, our approach also contemplates the susceptibility to event risks. These may emanate from the international, regional and domestic landscape to also include specific geopolitical dimensions.

We identify event windows, of varied length, over the past two decades. We deliberately start our analysis after the post-Dotcom bubble crash over 2 quarters in the US that overlapped with 2 quarters of heightened risk during the Argentinian Peso Crisis in 2002. Our analysis period runs to just prior to 2018, and before the onset of the Covid19 pandemic and all that comes after. Precisely, the data for which will estimate our VAR models is between 2003m12 and 2017m6. These event windows cover shocks that resonate globally but emanate, primarily from one of three economic blocs and geopolitical poles we define as key economies, both generally but also specifically from the perspective of African economies. The shocks themselves are defined by changes to economic output and impact systemic leverage in the global banking system, capital inflows and capital flight and, by extension, a range of asset prices.

From the start date, the first event window is the period of the Global Financial Crisis (GFC). The second event window is the period covering both the extended European Sovereign Debt Crisis (ESDC) and the more discrete event described as the Taper Tantrum. The third event window is a period covering an extended global equity market sell off and diminished risk taking that also includes a specific period of Chinese Financial Stress (CFS).

US shocks relate to global liquidity and risk appetite transmitted through monetary policy, both conventional and unconventional, as the anchor and hegemon in the global financial system. As a result the GFC and the Taper Tantrum are separate episodes of focus within our event windows. There are 8 one month periods covering spikes in risk aversion (as proxied by the VIX or its key economy variants) within the time period between 2007m7 and 2009m2 that cover the broad period in which the effects of the GFC were acute. During 5 of those one month periods, between 2008m9 and 2009m2, we observe the highest level of the VIX during the entire sample

period. However, during 3 one month periods, between 2013m5 and 2013m8, the impact of the Taper Tantrum was de minimis and not evident in the level of the VIX.

European shocks also relate to risk appetite but also global liquidity conditions and monetary policy, though primarily unconventional monetary policy through the ructions of the European Sovereign Debt Crisis (ESDC) and the period of negative rates. Additionally, the associated impact to European growth and its subsequent transmission beyond the bloc is of interest.

While we are interested in the potential impact of Chinese shocks to global liquidity an risk appetite from an African perspective, we are equally interested in the impact of China on global growth. Assessing this impact from the perspective of African equity capital market price behaviour requires deeper consideration of the transmission of effects between the real economy and financial markets. A major force that explains the environment shaping commodity prices has been the swings in China's investment cycle. A 10 year boom between 2001 and 2011 was followed by a 4 year decline then a 2 year rally. However, there are 3 one month periods, between 2015m7 and 2013m8, where we see the 3rd highest level of the VIX, that corresponds to a period where the broader Chinese financial system was subject to significant stress that included a devaluation of the RMB. The period of Chinese Financial Stress (CFS) seemingly had purchase to spill over into global risk appetite.

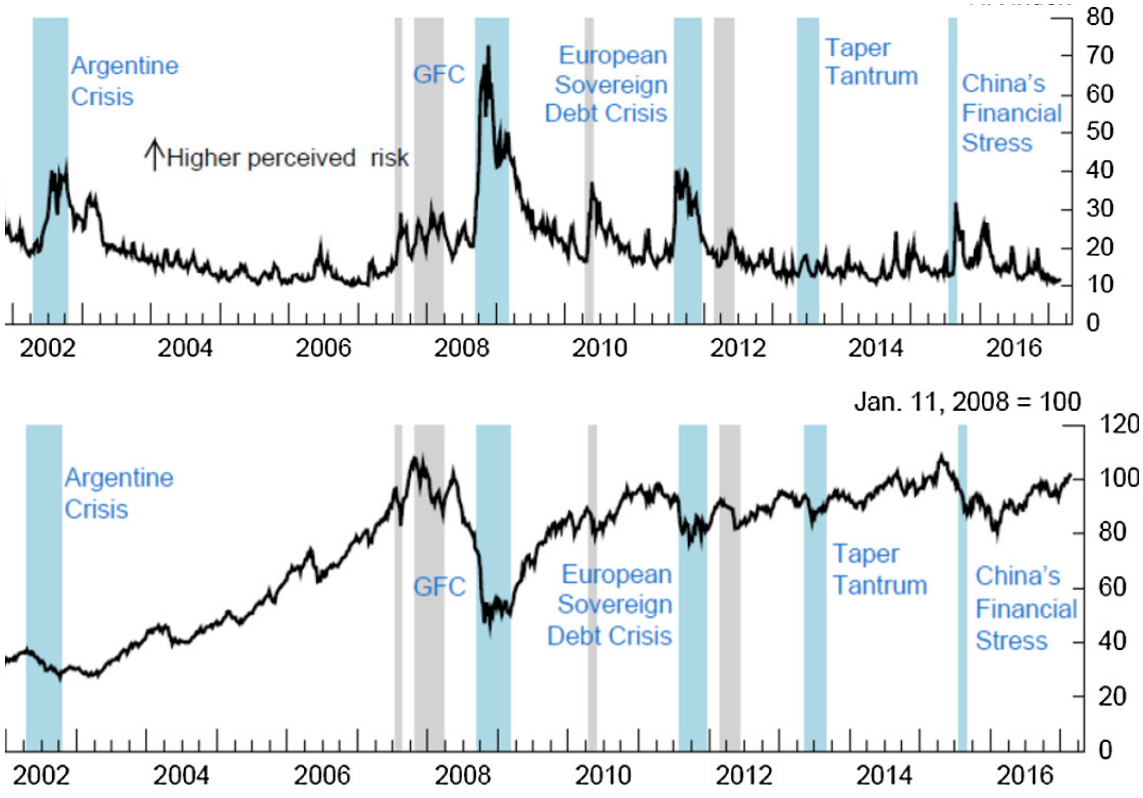


Figure 2.3: Episodic timeline of past events of financial stress

Note: This figure shows the level of the VIX in the top panel and the performance of the MSCI Emerging Market Local Currency Index through a selection (9 of 13) past events of financial stress identified in Ahmed, Coulibaly and Zlate (2017)

2.4.1 Contrasting economic country groupings

In this subsection we discuss the various dimensions on which we have grouped countries to observe contrasts. We have chosen dimensions that are important aspects of understanding the nature of relationships and potential strength of transmission channels between the real economy and public equity capital markets. Both in terms of representation and reflection, and ultimately resilience. As such, in exploring these parameters we sought to achieve somewhat balanced groupings.

We begin with a historical perspective on legal origins in Africa in order to highlight the impact on both institutional developments and economic outcomes. This is leads into a discussion the differing composition of the underlying economies, before considering important political perspectives. We also discuss fundamental economic components we observe at the country level, followed by observations about the composition of the underlying local stock market indexes in our sample. We then explore how we might rank countries and markets on various countries. This allows us to start to draw some inferences about the state of equity capital markets in Africa in order to identify useful patterns before testing our hypothesis. Then having level set certain parameters, we describe the framework and intent of our estimation procedures.

2.4.1.1 Historical perspectives

For the historical perspective, we take a step back to examine the role of legal origin influencing both institutions and financial development. Our sample includes seven market with English legal origin (common law) and three markets with French legal origin (civil code) and one market, described by La Porta, Lopez-de-Silanes and Shleifer (2008) as a mixed system with both English and French legal origin. An alternate interpretation, with more granularity, has been offered by the JuriGlobe world legal systems research project that placing countries legal systems as dominated by one of either Common Law or Civil Code precepts but mixed with another of or combinations of “customary” law, Islamic law or indeed the other main legal system. It ignores the German, Scandinavian or Socialist legal origins LaPorta described.

That said, the mapping of the distribution of legal origin highlights both the reality of the civil code and French legal origin dominating the continent of Africa, by number of countries and the patterns of regional concentration of common law and English legal origin on the continent. Specifically, it is predominant in Southern and Eastern Africa, but noticeably in two countries in West Africa.

2.4.1.2 Economic composition

On economic composition, we extend beyond our initial evaluation focused solely on the bifurcation between resource and oil exporting economies and more diversified economies within our sample. We explore numerous sources and types of aggregate macroeconomic data to develop different perspectives for segmenting the 11 country sample for comparison and further evaluation. On market dynamics, the basis of our understanding of the underlying features is based on total capital market size, including bonds and equities, and assets under management of local institutional investors. The table below is a ranking of countries on these dimensions of the financial market ecosystem.

Table 2.1: Sample country ranking – financial market ecosystem dynamics

	2017	
Country	Bond Outs. + Stock Mkt Cap ($bn)	Local Institutional Investor AuM ($bn)
ZAF	1,247	627
MAR	114	44
EGY	75	13
NGA	69	32
BWA	41	9
KEN	28	13
GHA	26	2
CIV	17	2
MUS	16	6
NAM	15	14
ZMB	9	1
average	**151**	**69**
average ex-ZAF	**41**	**14**
avg ex-ZAF, -NGA	**159**	**73**

Note: This table ranks countries by total capital market size and local institutional assets under management in in 2017. Author's calculations with data from OMFIF

In addition to the BIS classifications, we considered 2014-2015 data from the African Economic Outlook (2017) – with its theme of Entrepreneurship and Industrialisation - that makes comparison of sectoral (Agriculture, Manufacturing and Services) shares of GDP between global regions. We observe that the sectoral share of GDP for agriculture in the African regional economy of 16%, second only to South Asia. The sectoral share of GDP for services in Africa is the lowest of all global regions, but is responsible for more than half at 54%. Though the East Asia and Pacific region has the next lowest sectoral share of services it has the highest share of all regions in manufacturing (16%). Africa's sectoral share of GDP for manufacturing is the second lowest of all regions at 11%. Notable the region with the lowest sectoral share of DGP in manufacturing is North America – less surprisingly it is the region with the highest sectoral share in service (82%)

2.4.1.3 Political perspectives

Then, from a political perspective we can also assess the openness of countries through concepts of democracy and freedom, to draw inferences on the relative impact of financial

development, economic performance in terms of relative attractiveness or the propensity to attract investment and capital. The democracy freedom status data derived from Freedom House scores of countries on an annual only lends itself to integration into our monthly data set to help provide context of institutional conditions.

In the first instance, the distinctions are not binary. Democracy Freedom Status is defined as defined as Free (F), Partly Free (PF) or Not free (NF) which we considered utilising as a dummy variable to compare the performance of countries within our dataset. In the second instance, there is very little change in status over the sample period for individual countries. Both Cote d'Ivoire and Ghana both changed status in 2012. In the case of Cote d'Ivoire it was from Not Free to Partially Free where it remained, while in the case of Ghana it was also from Not Free to Partially free but it returned to Not Free status in 2013.

That said, we do use the data on Democracy Freedom Status with data we have manually collected into a register noting the month of elections and democratic events that have occurred in each of the countries in our sample. We include national, gubernatorial and municipal elections. Democratic events include constitutional changes as well as referenda. This register is useful for comparison to and explanation of the transition of democratic freedom mentioned above. In addition, we can assess whether these democratic events occur within or outside of event windows and note if and when they occur adjacent to structural breaks in the price series of any relevant variable. See the table in the appendix for a table collating this information,

2.4.1.4 Economic structure and fundamentals

From the macroeconomic perspective we must consider the economic fundamentals at the country-level. We can rank by nominal GDP and compare by scaled per capita income. Specifically, in comparison to the income levels of emerging and developing economies relative to advanced economies, but most particularly within EMDEs within Africa. See the table below ranking the countries in our sample by economic size, following the GFC, between 2010 and 2018 as well as the compound annual growth trend between those two points.

However, as of the point of initial data collection and within our sample time period, it transpired that the complete set of countries in our sample are all within the middle income classification – with the countries in our data set split between either low middle income (LMI) or high middle income countries (HMI) - with seven LMI economies and four UMI countries present. We are then able to isolate and compare the relative differences, perhaps at the margins, of response and performance of markets in LMI versus HMI countries.

Table 2.2: Sample country ranking – economic size and post-GFC performance trends

	2010	2018	2010-18	2010-18
Country	GDP ($bn)	GDP ($bn)	CAGR	*% change*
NGA	369	421.7	1.7%	*14.3%*
ZAF	417.3	389.2	-0.9%	*-6.7%*
EGY	230	263.1	1.7%	*14.4%*
MAR	100.9	127.3	2.9%	*26.2%*
KEN	45.4	92.2	9.3%	*103.1%*
GHA	43.3	67.3	5.7%	*55.4%*
CIV	34.4	58.5	6.9%	*70.1%*
ZMB	20.2	26.3	3.4%	*30.2%*
BWA	12.6	17	3.8%	*34.9%*
MUS	10.1	14.7	4.8%	*45.5%*
NAM	11.3	13.7	2.4%	*21.2%*
average	**117.7**	**135.5**	***3.8%***	***37.1%***
total	**1294.5**	**1491**		

Note: This table ranks countries by GDP in 2018 and calculates the cumulative average growth rates between 2010 and 2018. Author's calculations with annual data from

2.4.1.5 Equity index composition, concentration and industry leadership

We need to perform further analysis of the composition of the local stock market indexes in our sample of countries. While certain developed markets, and in particular the US, are currently exceptionally highly concentrated, it is the extension of a trend observed over more than a decade. Concentration in markets helps explain what drives those markets. In DM this is a question of industries leading those economies, while in EFM industry leadership might not accurately reflect the industries driving those economies directly. In Africa in particular, the levels of market concentration we measure in the representative local stock market indexes from our sample might also reflect domestic considerations of political economy. The interests groups could include industries (and perhaps industrialists), but also embed the broader legacies of historical, economic and financial developments, in institutions, over time. Alternatively or indeed additionally, the levels of market concentration observed and measured on local stock markets could be reflecting the effects of indexes policy could be reflected with significantly variable lag.

Following the GFC (at the beginning of 2009), the level of concentration in US and UK public equity markets, as measured by the total market weight of the top five stocks, exceeded 30%. At the same point in time, the concentration in the largest equity market on the continent, South Africa and the JSE All Share Index was, by that same measurement, was over 40%[38]. Current concentration in the US equity market – via the so-called current magnificent seven, beyond the FAANG grouping in fashion in 2017, now includes Apple, Microsoft, Alphabet, Nvidia, Meta and

[38] Data points referenced derived from Raubenheimer (2010)

Tesla – has driven US equity dominance "to new heights" in 2023.[39] An associated concentration in focus in EU equity markets, plural, that is on a pan European basis – comes via the so-called GRANOLA group of 11 stocks that includes Glaxo Smith Kline, Roche, ASML, Nestle, Novartis, Novo Nordisk, L'Oreal, LVMH, AstraZeneca, SAP and Sanofi. Finally, a similar concentrated group exists in the Chinese equity market – BATX consists of Baidu, Alibaba, Tencent and Xiaomi. By industry the European names (11) are dominated by healthcare, but includes technology and consumer names. The eleven names from the US (7) and China (4), would be broadly described as dominated by technology industry companies, though with a mix across hardware, software and service oriented firms.

However, calculating the total market weight of the top five shares in the rest of our sample countries at the end of sample period in 2017 shows a different and higher distribution of concentration in African public equity markets. The lowest market weight for the top five shares on a local stock index in Africa is 55% in Botswana and the highest is 82% in Kenya. Excluding South Africa,[40] we calculate average (64.64%) and median (61.95%) concentration levels, using the weight of the top five shares in represented in each index price series. We use the median concentration level as a dimension for segmenting the sample into two equal groups for comparison (ie above and below median market concentration) and integrated analysis.

When we considered ranking in dimensions of size we were highly aware of the skews in the distributions of nearly 650 constituent members of individual local stock indexes. The size of the total public capital markets[41], calculated at the end of the sample period was USD $1,654 bn. The top five markets measured by total public capital market size account for $1,533 bn of the total.

It is also worth highlighting the next dimension of both market concentration and size is industry representation within respective market indexes. Not least, to assess the relationship in each of the sample countries between the real economy and financial markets for other implications to consider. Four of the countries in those top five markets represent about a third of the continent's population but form a distinctive group. They represent significant growth over time, responsible for more than half of the entire continents' GDP, and the dynamic potential of the future digital trade opportunities on the continent, with more than half of the continent's mobile phone subscriptions.

[39] The MSCI All-Country World Index (3000 shares) would have declined YTD (24 Oct 23) if not for them (61% of $60trn market capitalisation)
[40] Due to a lack of access to index membership data during the period
[41] USD ($bn) value of the sum bonds outstanding and stock market capitalisation

Financials are represented among the top five stocks in every market at least once, in most cases more than once, and with four stocks in the cases of Botswana and Morocco. Materials, Telecommunications and Consumer stocks (both staples and discretionary) represent the other stocks making up the top five in other indexes. We can link this with the export and import data we have already mentioned that is indicative of the evolving economic structure of individual countries.

Because financials make up more than a third of the top industry concentration measure there are strong links to banks' role transmission of both monetary policy and dollar dynamics (via corporate clients, not SMEs per se). This gives credence to the role of leverage in the GFCy and a view of banks as a levered bet on economic growth. The source of growth in an economy then also matters. There is recent (early view) literature from Emmanuel et al (2024) making the policy suggestion for financial development approaches that prioritise a focus on bank- based policy support over market -based finance in the future. We discuss our nuanced but contrasting view on this approach in more depth another chapter, but the key point is that the sources of economic growth matter for both development and structure, and transmission dynamics as well.

However, table 2.3 below contrasts the industry shares in the underlying economies of the countries in our sample, at the end of our sample period. We take note the high share of agriculture in four countries in both of the economic classification groups, and consider the respective agricultural commodities they produce; Cote d'Ivoire (Cocoa) and Kenya (Tea) among MDEs, Ghana (Cocoa) and Nigeria (Palm Oil) among ROEs.

Table 2.3: Agriculture , Industry, Manufacturing, Services: share by country

country	Agri	Industry	Manu	Services	ecid group
CIV	25.0%	22.0%	13.0%	53.1%	
EGY	13.0%	36.0%	16.0%	46.2%	
MAR	13.0%	26.0%	16.0%	51.0%	**MDE**
KEN	25.0%	19.0%	11.0%	48.1%	
MUS	4.0%	22.0%	14.0%	62.9%	
BWA	2.0%	32.0%	6.0%	55.3%	
NAM	9.0%	28.0%	12.0%	57.2%	
ZAF	2.0%	27.0%	13.0%	61.0%	**ROE**
ZMB	4.0%	32.0%	8.0%	52.8%	
NGA	24.0%	25.0%	7.0%	50.8%	
GHA	28.0%	18.0%	6.0%	48.2%	

Note: The source of the economic composition data in this table is the AfDB Africa Economic Outlook (2017)

The question of whether an agricultural commodity is produced for domestic consumption or regional or international export sale raises issues of value addition (including regional and global value/supply chains) and technological intensity when considering economic contribution. The lower share of manufacturing seen across the countries sampled also highlights the scale of

challenge posed to industrialisation efforts. The high level of services[42] speaks to aspects of structural transformation in line with global trends.

2.4.2 Country comparison scenarios with two quasi natural experiments

In this section we discuss the setup of two (sets of) quasi-natural experiments, described as such because of similar economic conditions in which we can compare observed outcomes without random assignment to treatment and control group or an omitted variables problem. The first quasi-natural experiment (QNE) investigates index construction while the second investigates economic structure as conditioning factors affecting the resilience of price behaviour of a country's local stock market index in response to a range of factors :

2.4.2.1 Index construction comparison in Namibia

In the course of data collection we were struck by an obvious candidate for a quasi-natural experiments within one country of our sample. While we collected price series data for a second local stock index in three countries, in Namibia we were able to collect price series data for two local stock exchange indexes over the same time period. The FTSE JSE Namibia Overall and the FTSE JSE Namibia Local Indexes differ in size and composition. The Overall index is a market capitalisation weighted all share index with 28 constituent members in a total that includes a majority of companies cross listed elsewhere (primarily South Africa). At a quarter of the size, the smaller Local Index has 7 constituent members who only have a primary listing of their shares on the Namibian exchange.

The significant observation we make is the differing performance of the two exchanges during the shock of the GFC. This is illustrated in the figure 2.4 below – where the Overall Index closely tracks the performance of the MSCI EFM Africa Index, both in terms of the response to and recovery from the economic shock occurring in the GFC event window, the Local Index performs markedly differently during the same event window. The Local Index records no major drop in log price level and in fact demonstrates slight positive performance during the period.

[42] Industry sector shares do not total 100% for methodological reasons meaning there is an overlap, industry includes manufacturing. Source: African Economic Outlook 2017

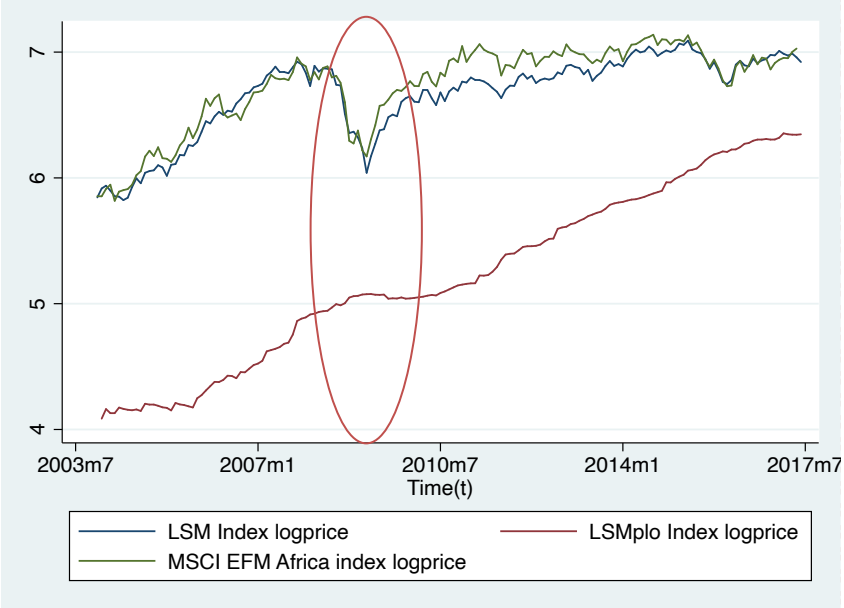


Figure 2.4: Divergence between two local stock indexes in Namibia during the GFC event window

Note: This table illustrates the divergence in nominal prices of a local stock index consisting of only stocks with their primary listing in Namibia, one including cross -listed stock and the MSCI EFMA index. The data was accessed via Bloomberg

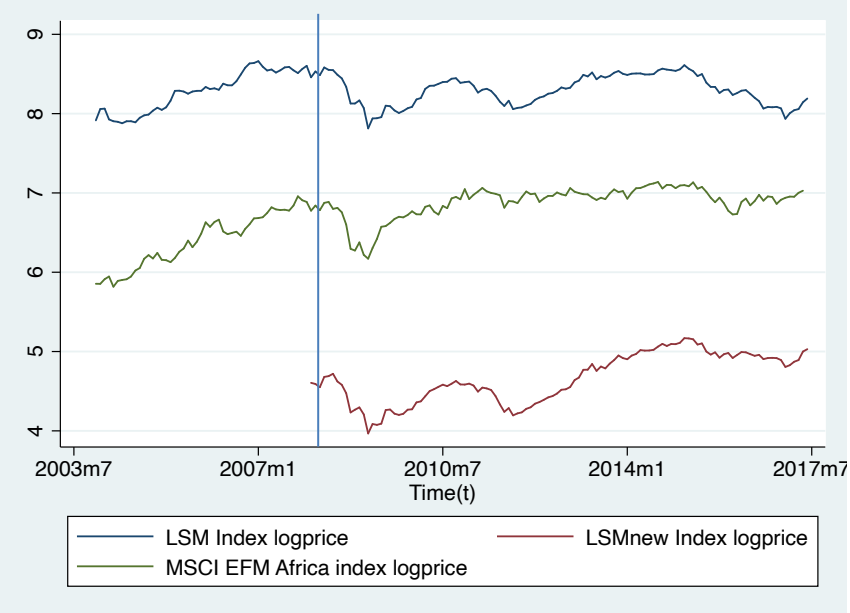


Figure 2.5: Mirror performance between 2 local stock indexes in Kenya and during the GFC event window

Note: This table illustrates the mirrored in nominal prices of a price and market weighted 20 stock index and a new all share composite index in Kenya and the MSCI EFMA index. The data was accessed via Bloomberg

In Kenya, in figure 2.5 above, the two local stock indexes we collected monthly price series data for differ in both series length and index composition. The primary price series used, the NSE 20 Index, with a longer data series, is a price and market performance weighted index with 20 constituents. The second local stock index price series, the NSE All Share, is a composite index

with 64 constituents. The inception date of the new index came at an inauspicious time, within the GFC event window (January 2008). The other country for which we collected monthly price series data for was Ghana. These local stock indexes differ primarily in length but the inception date, December 2010, corresponds to a period of significant institutional and structural change in Ghana.

In November 2010 the national statistics office completed a GDP rebasing exercise and revised Ghana's 2010 annual GDP upwards by 60% (in USD per capita terms) and also in December 2010 there was a change in de facto exchange rate regime from a de facto crawling band of +/-2% to the USD to a managed floating/de facto crawling band of +/- 5% to the USD. The primary series used, again due to length of data series, was a proprietary series, privately maintained by a local financial institution[43] on behalf of the exchange, while the second, newer series is a composite index with nearly double the constituent membership (41 vs 21). Notwithstanding the small overlap in sample (78 paired monthly observations), the two series are highly correlated (0.997).

However, the significant observation we make, illustrated in the chart below, is the stark divergence in the first series from the MSCI EFM Africa Index during the GFC event window. The drop in log price level in the MSCI EFM Africa Index is not replicated in the same period in the primary local stock index. It recorded a positive log return when the MSCI EFM Africa Index hit its GFC low but did record a negative return a few periods later.

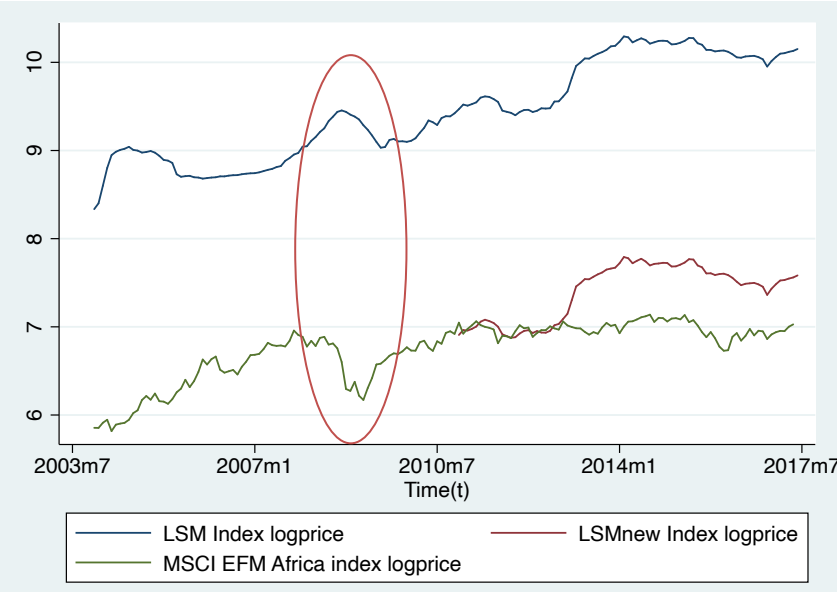


Figure 2.6: Divergence between an old and new local stock index in Ghana during the GFC event window

Note: This table illustrates the divergence in nominal prices of a proprietary, now non-public stock index and a new composite index launched and maintained by the GSE and the MSCI EFMA index. The data was accessed via Bloomberg and from Databank

[43] Databank Financial Group

2.4.2.2 Comparing the influence of Cocoa on index performance in Cote d'Ivoire and Ghana

In our second quasi-natural experiment we look to compare the possibly differing impact of the same commodity to the changes in different local stock indexes. Though Ghana sits within our combined resource and oil exporting economies classification grouping and Cote d'Ivoire sits withing our more diversified economies classification grouping, in terms of the agricultural commodity Cocoa, Cote d'Ivoire and Ghana stand apart from other countries as the two largest exporters on the globe. Cote d'Ivoire is the larger of the two producing and exporting 2/3 to 50% more Cocoa Beans than Ghana at various points during the sample period. Cocoa beans were a top export of Ghana in 2003 but were not by 2017, when it became ICT and Gold. Cocoa Beans remained a top export for Cote d'Ivoire in 2003 and 2017, but in addition to Cashew Nuts and Coconuts.

However, given the institutional and structural change that occurred in Ghana in 2010, we first test for structural breaks in the local stock exchange series for both countries in addition to structural breaks the price of Cocoa/bag in USD. Then we run a panel regression comparing the changes in both of these local stock indexes in a key bloc linear specification that includes the EU variant volatility index and liquidity rate and use cocoa as the a key commodity for the lagged regional growth proxy term and a lagged EU growth proxy (Industrial Production).

2.5 Discussion of results

2.5.1 Results of panel regression estimations for two quasi-natural experiments

In this section we present and discuss the results of the analysis in the previous section. We describe the results of differing specifications and related groupings, and sub sample comparison which frame distinctions to draw inferences related to our propositional hypotheses. We first obtain linear estimates before for certain specifications, with identification driven by panel cross sectional dimensions - groups, structural country, public equity market and index characteristics – and compare variable coefficients. That discussion also integrates the presentation of results from the two quasi-natural experiments discussed above.

We then describe the three geoeconomic zones we construct, perform panel linear regressions and estimate preliminary comparative coefficients. We then perform panel VARs and predict IRFs, first for key economic bloc (US, CHN and EUR) specifications and particular regime case study sample to underscore the transmission dynamics through the specific event windows. We then predict IRFs, with identification in regionally grouped geoeconomic considerations and characteristics, to derive further inferences and draw conclusions related to our hypotheses

2.5.1.1 Panel regression estimates of linear coefficients

The first group of three dimensions we test are meant to reveal the impact of historical policy choices and decisions against more contemporaneous relative policy outcomes. To explore elemental drivers economic structure, complexity and outcomes we consider the following three related classifications – historical legal origin, economic classification and income per capita – using dummy variable instrumentation.

The importance of historical legal origin (HLO) is well discussed broadly in the literature, not least given the post-independence development paths taken by countries in our sample. But our dummy variables utilise the narrower definitions of English legal origin (ELO) and French legal origin (FLO) of La Porta, Lopez-de-Silanes and Shleifer (2008) with an additional definition that has to be applied to one country, Mauritius, mixed legal origin (MLO).

In table 2.4 below, we find that for the coefficient of the lagged change in the local stock market index, the ELO group has a higher than the FLO group, but the MLO is significantly higher than both. The ELO and MLO both have a similarly low coefficient for the change in volatility index variable relative to FLO, but ELO has the highest coefficient for the lagged key bloc growth proxy variable used in the specification, US Industrial Production variable.

Table 2.4 : Historical Legal Origin panel regression coefficient estimates

	[7]	[3]	[1]
group ID: Historical Legal Origin	**ELO**	**FLO**	**MLO**
Variable	estimate	estimate	estimate
Δ in log of Local Stock Index, (t-1)	**0.1364918**	**0.122802**	**0.2294738**
Δ in Local Real Rate (t-1)	3.433E-06	2.801E-05	-0.0004816
Δ in log of VIX	-0.0386251	-0.0643625	-0.0377723
Fed Funds rate	0.382966	0.4469568	0.3925919
Δ in Regional IP1 (t-1)	0.0289518	0.0205561	0.1543654
Δ in US IP (t-1)	**1.3248966**	**1.1447344**	**0.8303904**
constant	5.853E-05	0.0007703	0.0007073

Note: This table reports coefficients estimated with equation 2.1 using monthly data period 2003m12 to 2017m6 from multiple sources; La Porta, Lopez-de-Silanes and Shleifer (2008) supplemented with data from the JuriGlobe World Legal Systems Research Group

Where the impact of historical legal origin has a long tail, the remaining two classifications are focused on measuring outcomes of more recent states. The economic classification method is based on 3 groups of BIS classifications being combined into two distinct groups. This offers benefits for comparison by nearly balancing the group sizes, in number if not necessarily weight.

Groups. The income per capita classification groups are not as balanced however. Our entire sample consisting of middle income countries makes the distinction between upper middle income (UMI) and lower middle income (LMI) useful but it is biased to LMI countries with 7. The development challenge from low income to middle income to high income is real, but moving up, between and through the middle income stage is known to be the trickiest. The role of financial developments at this stage is critical.

In table 2.5 below we first note that we use a reduced form specification for income per capita classification to focus comparison on differences in the coefficient for the lag in change in the local stock index variable. While they are broadly similar between ROEs and MDEs, they are distinct between UMI and LMI economies. The coefficient for LMIs is approximately double that of UMIs. In the specification used for economic classification we focus on the lagged change in key commodity and change in local currency to USD variables. As we would expect, the change in key commodity variable is higher in the ROE group but not significantly so. This might be explained by the impact of agricultural commodities on certain MDE countries. We explore this possibility the discussion of a quasi-natural experiment below. But we also note a higher coefficient for the change in local currency to USD in the MDE group.

Table 2.5: Economic dimensions panel regression coefficient estimates

	[6]	[5]
group ID: Economic Classification	**ROE**	**MDE**
Variable	estimate	estimate
Δ in log of Local Stock Index, (t-1)	0.1548679	0.1221341
Δ in Local Real Rate (t-1)	-5.667E-05	-0.0005011
Δ in log of VIX	-0.0438196	-0.0599309
Fed Funds rate	0.407119	0.4096523
Δ in Regional IP1 (t-1)	0.0166496	0.0195168
Δ in key commodity (t-1)	**0.0740559**	**0.0524748**
Δ in log LCY/USD	**0.093025**	**0.1299612**
Δ in US IP (t-1)	1.2633611	1.1968987
constant	0.000769	-4.748E-05

(a)

	[4]	[7]
group ID: Income Classification	**UMI**	**LMI**
Variable	estimate	estimate
Δ in log of Local Stock Index, (t-1)	**0.0784482**	**0.1543959**
Δ in log of VIX	-0.0592297	-0.0379012
Fed Funds rate	0.4334568	0.3698417
constant	0.0008795	0.0013559

(b)

Note: This table reports coefficients estimated with equation 2.1 using monthly data period 2003m12 to 2017m6 from multiple sources

2.5.1.2 Quasi-Natural Experiment 1: Two countries with respect to the influence of the same Key (agricultural) Commodity on local stock indexes

Using Supremum Wald tests for a structural break of an unknown date , we estimate the date of potential structural breaks in 3 sets of asset price series. For the local stock index prices series for Ghana and Cote d'Ivoire our estimations include both the log level and first difference. For the USD price of coco/ bag our estimation is only for the change in level. The table below shows the results indicating only one statistically significant break date at the 1% level, in the log level price of the local stock index in Ghana in the last period of 2012. The estimated structural dates of the change in log of both local stock indexes are one month apart in 2009, however neither are statistically significant, nor is the estimated break date, in 2013 in the cocoa price series. However, the fact this estimated break date falls 3 periods after the statistically significant break date estimated for the log price of the Ghana locant stock index.

Table 2.6: Structural break test results, QNE1

	est break date	swald stat	sig
log GHA Local Stock Index	**2012m12**	**18.7032**	***
Δ in log GHA Local Stock Index	2009m7	9.1436	
log CIV Local Stock Index	2012m11	8.2703	
Δ in log CIV Local Stock Index	**2009m6**	**11.0522**	
Δ in level, price of cocoa/bg ($)	2013m3	4.4725	

Note: This table reports the results of the Supremum Wald tests for structural breaks on an unknown date with a winsorised selection of comparative monthly data of the LSIs for GHA and CIV and a key commodity price accessed via Bloomberg

We also estimate the coefficients of panel regressions for both countries in a specification including the key commodity as well as the volatility, liquidity and IP growth variables from the European key bloc. While this might favour the Cote d'Ivoire given its use of the CFA and its tight relationship with the Euro, comparison of the difference in coefficient estimates in the table below are interesting. There is a significant difference in magnitude of the coefficients for the lagged change in the local stock indexes. But the more interesting result is the difference in signs for the coefficient for the lagged change in cocoa – it is negative and small for Ghana and positive and five times larger in absolute terms for Cote d'Ivoire. This result is made more interesting by the fact the BVRM exchange, while located in Cote d'Ivoire is a regional exchange.

Table 2.7: Panel regression coefficient estimates, QNE1

	[1]	[1]
GHA, CIV key commodity - cocoa	**GKC**	**CKC**
Variable	estimate	estimate
Δ in log of Local Stock Index, (t-1)	**0.5969043**	**0.1725233**
Δ in log of V2X	0.0024311	-0.0559855
Δ in log LCY/USD	-0.0518751	1.3996593
Δ in key commodity (t-1)	**-0.0276145**	**0.1186411**
Δ in EU IP	-0.0393232	0.8586079
constant	0.0039924	0.0043953

Note: This table reports coefficients estimated with equation 2.1 using monthly data period 2003m12 to 2017m6 for LSIs for GHA and CIV and a key commodity price accessed via Bloomberg

To explore drivers of local stock markets in Africa and how certain factors interact we deploy another set of dummy variables to focus implicitly on stock and flow characteristics. We use them to understand where and how index composition, concentration and stock market leadership dynamics might resonate. We also try to assess if and how size might interact with global factors in particular in estimating a standard specification with dummy variable instrumentation on dimensions of market size and market concentration.

To investigate market size we construct a group based on the top five markets in the sample, based on nominal GDP at the end of the sample period. This group includes four countries - Nigeria, Egypt, Kenya and South Africa - that beyond size also represent a degree of dynamism insofar as the digital opportunity set in Africa. The fifth – Morocco - has been pursuing a path of some strategic intention we discuss further below, and marketing itself as a gateway to Africa[44] to European and Middle East trading partners.

To investigate market concentration we calculated average and median concentration based on share of top five equities in the respective index - average concentration is 64.64% and the median concentration is 61.95% at the end of the sample period. Though we lack data during the sample period for South Africa this allows us to construct two equal sized groups of above median concentration (AMC) and below median concentration (BMC), that matches the size of the top five the group (TFG) which contains members of both.

We use a standard key bloc specification that includes a regional growth proxy - US IP and Regional Industrial Production variables to estimate linear coefficients reported in the table below. The starkest observation we make is in comparing the coefficients for the lagged change in the local stock index variable. The coefficient for BMC group is approximately triple the size of the AMC or TFG. It is more difficult to interpret the observations about the coefficient for the change in effective liquidity rate from the key bloc, Fed Funds rate in this specification. TFG has the largest

[44] And in 2023, Marrakesh, Morocco was the location of first IMF Annual Meeting in Africa in exactly half a century, since Nairobi, Kenya hosted in 1973

coefficient, but the BMC group has the next largest coefficient, which is a third higher that of the AMC group. The interpretation is confounded by the potential contradiction, embedded in the group construction, and the degree of the overlap between TFG and AMC membership.

Table 2.8: Market size and concentration dimension panel regression coefficient estimates

	[5]	[5]	[5]
Median Market Concentration	**AMC**	**BMC**	**TFG**
Variable	estimate	estimate	estimate
Δ in log of Local Stock Index, (t-1)	**0.0867413**	**0.2311697**	**0.0717559**
Δ in log of VIX	-0.04715	-0.0263139	-0.0677589
Δ in Fed Funds rate	**1.8776212**	**2.8850199**	**3.133776**
Δ in Regional IP1 (t-1)	0.0190164	0.0275257	0.0247976
Δ in US IP (t-1)	1.3153267	1.0224114	1.3536529
constant	0.0037908	0.0066588	0.0042574

Note: This table reports coefficients estimated with equation 2.1 using monthly data period 2003m12 to 2017m6 accessed via Bloomberg

2.5.1.3 Quasi- Natural Experiment 2: One country with respect to comparing an Overall Index versus Domestic (Primary) listings only index

The figures in the sections (2.x-2.xabove and 2.x-2.x below) make clear the divergent performance between the an index with stocks cross listed elsewhere in Southern Africa and an index representing stocks with their primary listing in Namibia. We estimate coefficients using a standard key bloc linear specification that includes the US volatility index and liquidity rate variables and a lagged regional growth proxy (Regional IP) variable and a lagged US growth proxy variable (US IP). The results in the table below illustrate significant differences in the coefficient signs for three variables in this specification. The coefficient for the lagged change in the larger overall local stock index is slightly negative and the domestic listing only local stock index has a positive coefficient. The coefficient for the change in volatility index is negative for the overall index, whereas it is also positive for the domestic listing only index. However, the coefficient for the regional growth proxy variable is positive for the overall index and negative for the domestic listing only index.

Table 2.9 : Panel regression coefficient estimates, QNE2

	[1]	[1]
NAM overall and dom. listed only	**NOA**	**NDL**
Variable	estimate	estimate
Δ in log of Local Stock Index, (t-1)	**-0.0086685**	
Δ in log of Local Stock Index2, (t-1)		**0.0328106**
Δ in log of VIX	**-0.1173378**	**0.0018165**
Δ in Fed Funds rate	0.3674131	0.189513
Δ in Regional IP1 (t-1)	**0.0975007**	**-0.1202403**
Δ in US IP (t-1)	1.8597199	0.2902061
constant	-0.0001867	0.0105597

Note: This table reports coefficients estimated with equation 2.1 using monthly data period 2003m12 to 2017m6 accessed via Bloomberg

This may be explained by the choice, components and behaviour of the regional growth proxy. As Namibia is part of the Common Monetary Area (CMA) and the regional growth proxy is dominated by South Africa (which also dominates the region's growth and other regional proxies we might expect co movement and similar coefficients. Both indexes have positive coefficients for the US growth proxy variables, but the overall index is much larger. This also indicates degree of insulation from global growth and volatility factors in those domestic only listed stocks in Namibia.

Then finally, to explore the impact of regional dynamics, we group the countries in our sample into three geoeconomic zones, to estimate coefficients in our last set of panel regressions. The first geoconomic zone (RND) consists of the 2 countries in our sample that are members of the CMA; Namibia and the monetary anchor, South Africa. The second geoeconomic zone (ESA) consists of 5 countries that are members of COMESA, but excludes the 2 members we have already placed in the RND geoeconomic zone; . The third geoeconomic zone (ECO) consists of the 3 countries in our sample that are members of ECOWAS; Cote d'Ivoire, Ghana and Nigeria. It also include a country we describe as a putative member, Morocco. As mentioned above, Morocco we consider Morocco was acting with strategic intention when it made overtures to join the ECOWAS regional economic community. While the application is currently on hold we still fell it is a valid inclusion in the ECO geoeconomic zone.

Table 2.10: Panel regression coefficient estimates, geoeconomic zones

	[5]	[4]	[2]
Geoeconomic Zone	**ESA**	**ECO**	**RND**
Variable	estimate	estimate	estimate
Δ in log of Local Stock Index, (t-1)	**0.1633569**	**0.1783892**	**-0.0655723**
Δ in log of VIX	**-0.0454128**	**-0.0250266**	**-0.1191349**
Δ in Fed Funds rate	0.4579744	0.3067993	0.4011505
MoM Δ in Local Real Rate (t-1)	-0.0004592	-4.913E-05	0.0003762
Δ in log LCY/USD	**0.0573414**	**0.2165213**	**0.1465463**
Δ in key commodity (t-1)	0.0476325	0.0571123	0.0468936
constant	0.0018038	0.0014756	0.0029282

Note: This table reports coefficients estimated with equation 2.1 using monthly data period 2003m12 to 2017m6 accessed via Bloomberg

2.5.2 Discussion of results of IRFs and FEVDs, through event windows

2.5.2.1 Panel vector autoregression (pVAR) estimations

The (macro)econometric techniques associated with vector autoregression models are prevalent in a corner of the literature addressing similar research questions with panel data. Our panel approach is supplemented by implementing modelling procedures described in Abrigo (2016). We start with GMM estimation, then employ two structural analysis tools employed post-estimation, impulse response functions (IRFs) and forecast error variance decomposition (FEVDs). In particular the discrete analysis of tracing the dynamic impact of a selection of variables and identify patterns can be accomplished with IRFs and FEVDs.

We use the FEVD to measure the volatility in each impulse variable – as a proportional contribution to variance contribution - as a result of a one unit impulse to each state disturbance at period 1, then track how the impulses propagate the system for 10 periods. We use IRF forecasts to interpret the impact on our single variable of focus for a range of impulses and assess the relevance to the core elements of the system underpinning our hypotheses. To isolate analysis of our response variable of interest[45], the IRF graphs presented exclude the sub graphs of all the other combinations of impulse and response variables.

In the following sub-sections below, we aim to only present the most relevant results for discussion. The pVAR GMM estimations are used to compare the relative size of coefficients across

[45] Notwithstanding the focus on this specific variable, we do not believe it impacts any other truly exogenous variable, though we accept there could be a recursive relationship with financial or economic variables that could be used in the country block in a less parsimonious specification of our VAR model.

the differing specifications, and assess the strength of statistical significance, if any, at the 1% 5% and 10% confidence levels. All predicted IRF graphs plot the response variable with a 95% confidence interval, and include a zero line.

Some tables for reported pVAR GMM estimation are in appendix B. However, we only used pVAR estimates that satisfied the eigenvalue stability condition and concluded the model was stable by observing all the roots of the companion matrix are all inside the unit circle. The appendix also includes an example of graphical results of the postestimation checks of the stability condition for the final set of estimates. We only present the forecast error decomposition for our core response variable of interest, the change in local stock exchange index , with FEVD tables also in the appendix. It also includes a table listing and describing all variables used in the pVAR model system (in differing specifications) with their sources.

2.5.2.2 LSI response to (3) key bloc impulse variables, industrial production specification, full panel

We first considered LSI Responses in a two versions of broad specification to key bloc impulse variables impulse variables, the ex-post Local Real Rate, GFCy (or kGFCy) proxied by VIX and Fed Funds rate, (or CHN, EU variants, VAS and PBoC rate, V2X and ECB rate), regional and key bloc IP

All impulse variables from the pVAR GMM coefficient estimates are statistically significant in the US and CHN specific equations, in the EU equation the volatility index is not. The volatility index variable coefficient is only significant at the 5% confidence level in the US and 10% level in CHN. The effective liquidity rate variable coefficient is significant at the 1% level in the US and CHN equations and at the 5% level in EU, but the US and EU coefficients are 3 and 4 times larger respectively than the CHN coefficient.

The coefficient estimates for the ex-post Local Real Rate variable are statistically significant to the 5% level in all 3 key bloc specifications but significance levels vary for the regional growth proxy variable, industrial production (IP). Regional IP coefficient estimates are statistically significant at the 1% level for the US and EU, and at the 10% for CHN. The coefficient estimates also vary for the key bloc growth proxies, significant at the 1% level for the US and CHN and 5% for the EU.

The first observation from the FEVD table is the proportion of the variance contributed by the lag of the local stock exchange index (LSI) as an impulse variable. It is above 94% for each key bloc and highest in EU, above 97%. The proportion of the variance contributed by US and CHN IP are in a similar range around 2-3% but significantly smaller for the EU around .03%. However, the

proportion of variance contributed by the US and EU variants of volatility indexes are similarly higher that the CHN variant, around 1.5% for the US and EU and 0.5% for CHN. The last observations we make are the variance contributions of the Local Real Rate variable. It is similarly small contribution for all 3 key blocs at .02-.03% with the US largest.

The forecasted IRF graph below shows the impact of the Local Real Rate is initially negative and converges to near 0 across all three key blocs by period 2. The peak of the impact for the volatility index variable is in period 1 across all 3 key blocs but in period 2 the VIX shows a slight positive impact before converging to close to 0 by period 6. The impact of the VAS converges to 0 after period 2 with the V2X converging to 0 after period 3. The effective liquidity rate variables of the US and EU key blocs have wide confidence intervals, while the CHN key bloc ELR variable used, the PBoC rate, has a far thinner confidence interval, the lowest peak and converges to 0 by period 2. The EU key bloc ELR, the ECB rate, variable peaks at period 1, is stable for a period before becoming negative. It has the widest confidence interval which begins to narrow in period 5, with its effects dissipating and converging to 0 by period 10. The Fed Funds rate and US key bloc (and global ELR) peaks in period 2 and the effect of a shock in this variable has not entirely disappeared by period 10.

The behaviour of the regional IP variable is directionally similar across the 3 key blocs but the length of impact varies. In the US and EU key blocs effect of the regional IP variable peaks in period 1 and converges to near 0 in period 2, slightly higher in the EU key bloc which converges to 0 after period 5 while the US converges to 0 before period 5. In the CHN key bloc the regional IP variable also peaks in period 1, but at a higher level than the other 2 key blocs and after. It also converges to near or at 0 then becomes positive in period 3 before converging 0 again. EU IP has a wide confidence in period 1 and 2 with effect lasting through periods 3 and 4 before converging to 0 between period 8 and 9 having peaked at the highest level. US IP peaks in period 1, turning sharply negative in period 2 and then gradually dissipating after period 5 to 0 by period 9.

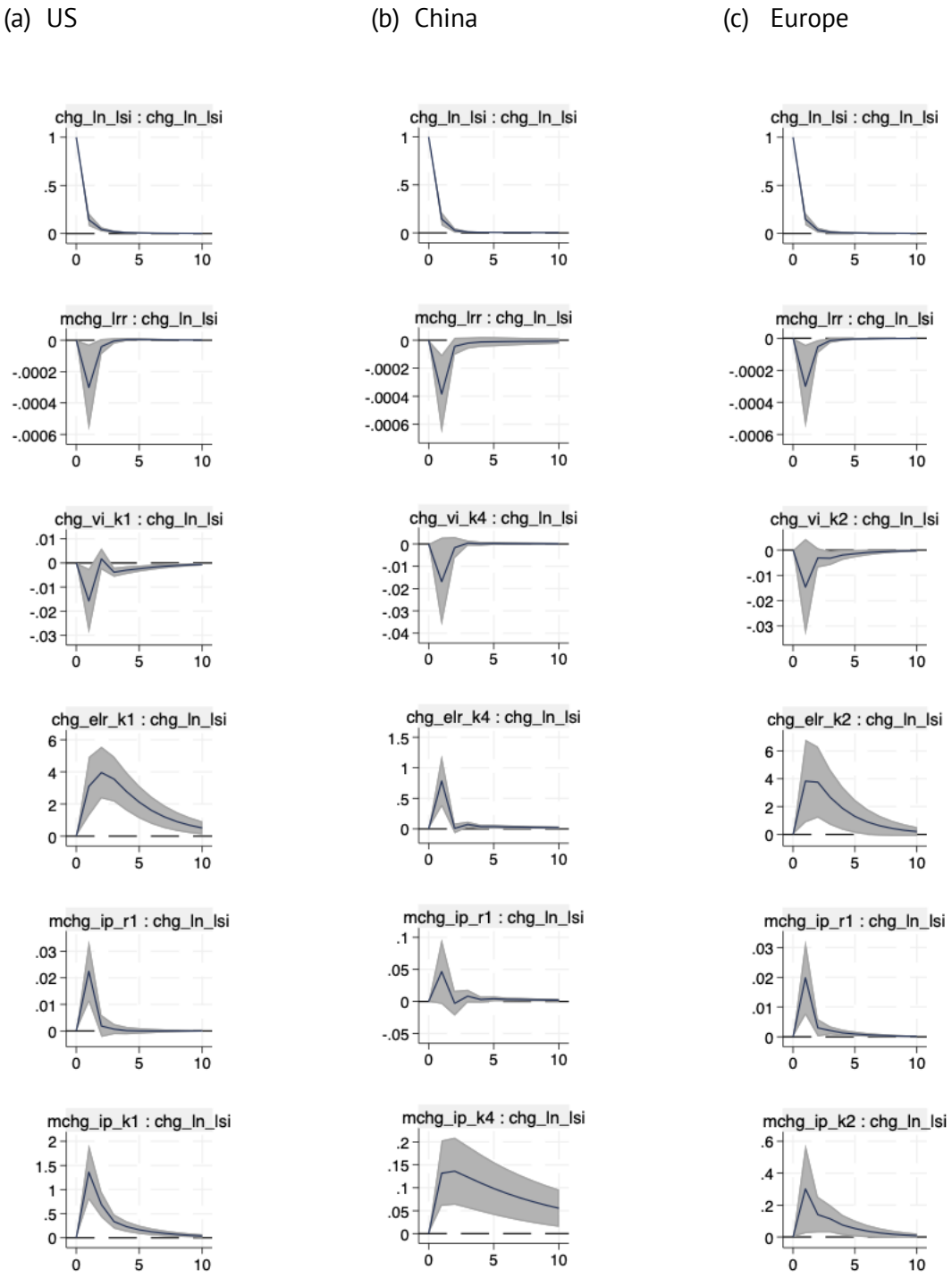


Figure 2.7: LSI response to (3) key bloc variables, industrial production specification

Note: This figure traces the IRF of the LSI to a one unit shock from US impulse variables in panel (a) and China impulse variables in panel (b) and Europe impulse variables using monthly data from multiple sources listed in table 2.11

2.5.2.3 LSI response to (2) key bloc impulse variables, key commodity specification, full panel

The second version of the broad key bloc specification uses the same impulse variables as above but with the key bloc IP variable replaced with the Key Commodity variable we estimated the coefficient for the US and CHN. They observed they were both significant to the 5% level, compared to the 1% level for IP), and similar sign. There was a size difference, with the US coefficient about a third larger.

The first observation from the FEVD table for the 2 key bloc specification is the contribution to variance by the Key Commodity variable. While small the variance contribution in the CHN equation of .082% is double .049% that contributed in the US. The other observation is the significantly higher relative contributions of the LRR and volatility index variables in the US

The only difference between the forecasted IRF graphs discussed in the prior section and those presented above/below is the key commodity variable. In both cases it peaks in period 1 and the effect has diminished by period 4. However, in the CHN key bloc it is at a slightly higher level.

(a) US (b) China

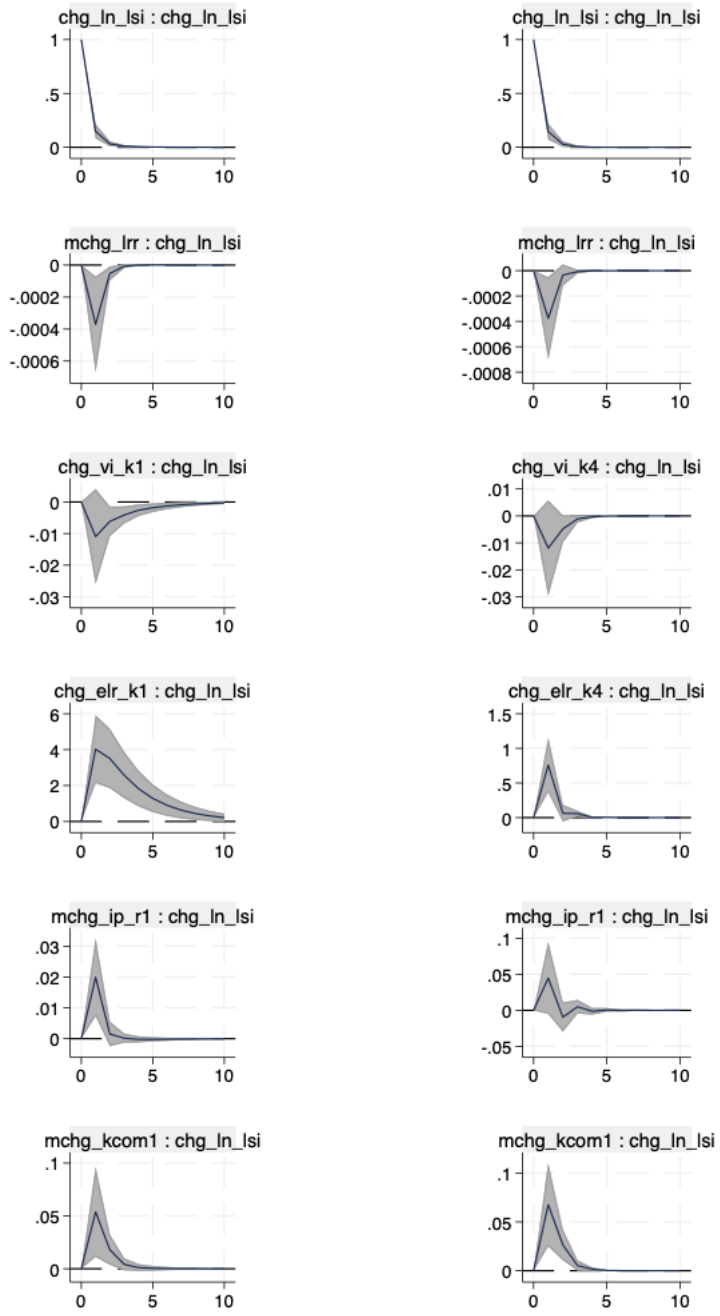


Figure 2.8: LSI response to (2) key bloc variables, key commodity specification

Note: This figure traces the IRF of the LSI to a one unit shock from US impulse variables in panel (a) and China impulse variables in panel (b) using monthly data from multiple sources listed in table 2.11

2.5.2.4 LSI response to (1) key bloc impulse variables, reduced form key commodity specification, sampling de facto exchange rate regimes

Using a reduced form specification with the only Impulse variables Local Real Rate, VIX and Key Commodity we estimate coefficients through de facto exchange rate regimes, as classified in Ilzetzki, Reinhart and Rogoff (2017). In our sample there are no countries or periods with an exchange rate regime operating a dual market with missing parallel market data or a de facto Freeling Floating exchange rate regime (de facto regimes 6 and 4). There is however one country, Nigeria, whose exchange rate regime was classified for a period during our sample (27 observations) as Freely Falling (de facto regime 5). The other 3 regimes range from managed floating to including crawling pegs and bands (de facto and pre-announced, +/- 2 or 5%) to currency boards and no separate legal tender.

Though done for each available regime, we only observe strongly statistically significant coefficients in two samples. In the group combining regimes 3 to 1, and in regime 2 the Local Real rate impulse variable is significant at the 1% level. The Local Real Rate is significant to the 10% level in regime 3. The Key Commodity impulse variable is significant to the 5% level in the group combining regimes 3-1, the 10% level in regime 3 and to the 1% level in regime 1.

We are intrigued by the stark contrast in the proportion of variance contributed by the lagged LSI impulse variable we observe in the respective FEVD tables for regime 5 and regime 2. 88% of the variance contribution comes from the prior period change in LSI in regime 5, a freely falling exchange as opposed to 98% in regime 2, which includes a de facto or pre-announced crawling peg or band (+/- 2%). The contribution from other variables also varies notably, with the VIX and Key Commodity variables contributing significantly more in regime 5.

The forecasted IRF graphs in figure 2.9 below show that in a freely falling exchange rate regime the response of the LSI to its own lag is sharply negative in period 1, with its trough below the zero line, followed by a positive response in period 2 and 3 before turning negative, eventually converging on 0 by period 6. Also in a freely falling exchange rate regime, response of the LSI to a shock in the VIX actually start positive, then oscillates between negative and positive until period 5 before convergence to 0. In the more fixed exchange rate regime the LSI response to the VIX is as more normally expected, initially negative. The impact of the VIX peaks in period 1 converging to 0 in period 2. The response to the Local Real Rate variables are again different and with the same pattern and impact length. Though in the more fixed exchange rate regime convergence to 0 is in period 3 and in a freely falling exchange rate regime the confidence interval is wider.

Finally, the LSI response to a shock in a key commodity is directionally similar in both de facto exchange rate regimes, but the same oscillation pattern is observed in the freely falling scenario to

approximately period 5. In the more fixed regime convergence to 0 is complete by period 4. The obvious conclusion to be drawn here that a degree of exchange rate regime management mattered for market resilience.

(a) Freely falling

(b) Crawling peg or band

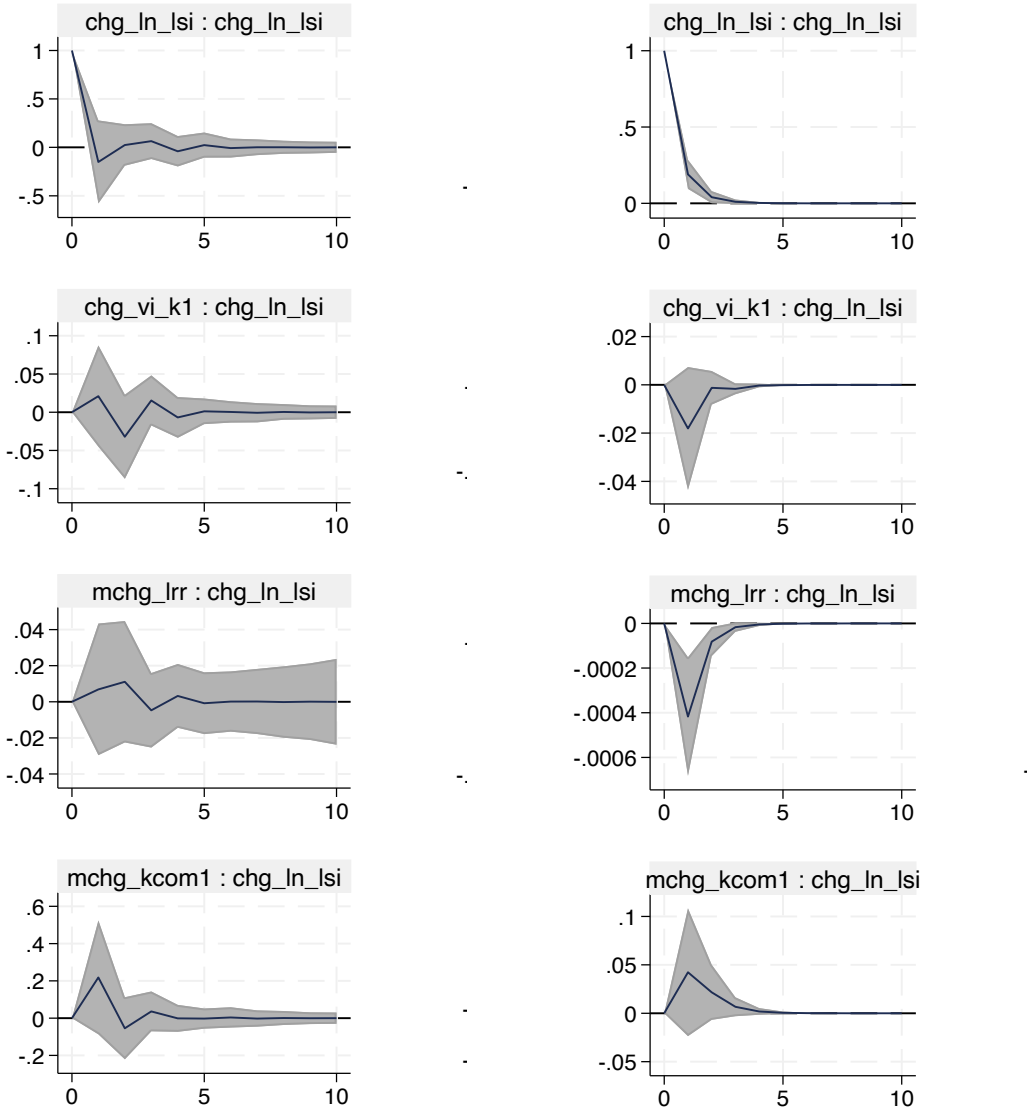


Figure 2.9: : LSI responses in different de facto exchange rate regimes

Note: The figures in panel (a) traces the IRF of the LSI to a one unit shock in a freely falling exchange rate regime while panel (b) traces the IRF of the LSI in an exchange rate regime with a crawling peg or pre-announced or de facto band using monthly data from multiple sources listed in table 2.11

2.5.2.5 LSI response to global common risk factor, regional and key bloc impulse variables, broad specification, full panel

While confirming the three key blocs as sources of diverse impacts – through the GFCy and kGFCy variants - on changes in LSI in a number of specifications, we also confirm the dominance of the US specific overall influence. The sample period is characterised by unconventional monetary policy in response to economic and financial crisis in the three key bloc that resulted in persistently low interest rates. The sampling exercise discussed above begins to establish the importance of a countries' institutional stance in a strictly macro-financial sense.

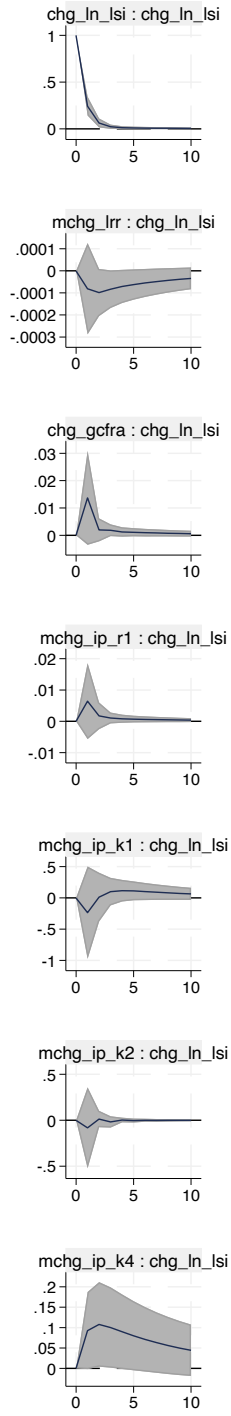
Questions have been emerging in the literature, as documented by Miranda-Agrippino, Nenova and Rey (2020) about the changed role of the VIX (and by extension its variants) as a barometer of global risk aversion. So at this stage, we replace the volatility indexes and effective liquidity rates of the three key bloc with a new impulse variable, the Global Common Factor for Risk Assets (GCFRA) updated in Miranda-Agrippino, Nenova and Rey (2020). Then, using the broadest specification of impulse variables including Local Real Rate, primary and secondary regional growth proxies, 3 key bloc and a world growth proxies (IP) we experiment iteratively to establish a new full panel baseline. Our experimentation with the number of relevant impulse variables to include and have the model remain stable results in dropping World IP and secondary Regional IP variables.

There are four statistically significant coefficient estimates, the primary Regional IP, US IP and CHN IP variables, all at the 1% level. US IP has the largest coefficient, nearly 10 times the size of CHN which is next and of a similar size to the primary Regional IP variable. The FEVD table shows more than 97% of the variance is contributed by the lagged LSI . The coefficient of the GCFRA is negative and approximately 40% smaller than key bloc variant component variables though correctly signed. The forecasted IRF graph of the full panel is in the appendix.

2.5.2.6 LSI response to global common risk factor, regional and key bloc impulse variables, by geoeconomic zone sub panels

The final set of results to discuss are the LSI Responses to a broad specification with GCFRA as GFCy proxy. The remainder in the set of rationalised impulse variables include the ex-post Local Real Rate, the primary regional IP (secondary dropped) and 3 key bloc IP (world IP dropped) variables. We discuss the results by 4 sub panels derived from the 3 geoeconomic zones we constructed – ECO, ESA and RND. The fourth panel is the combination of ESA and RND. As a result the forecasted IRF graphs presented below contrast ECO and ESA+RND. IRF graphs of all 4 sub panels are in the appendix.

(a) ECO



(b) ESA+ (incl. RND)

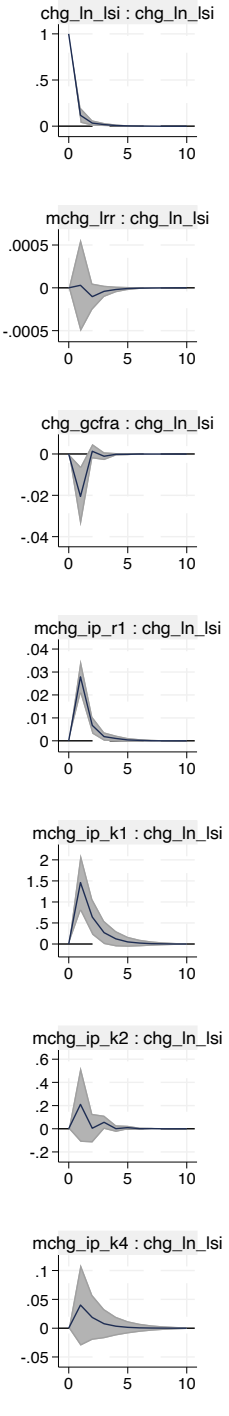


Figure 2.10: LSI responses to impulse variables by geoeconomic zone

Note: This figure traces the IRF of the LSI in the ECO zone in panel (a) and a combined ESA + RND zone to a one unit shock from the GCFRA and other US impulse variables using monthly data from multiple sources listed in table 2.11

The pVAR GMM estimated coefficients reveal some curious results, the response of the LSI to a lagged shock in itself is not statistically significant in the RND subsample but is significant to the 1% level in ECO and ESA. Regional, US and CHN IP are significant to the 1% level in ESA while only CHN is statistically significant in ECO, but to the 10% level. The coefficient of the response of the LSI to a lagged shock in itself is also negative. Combining the RND and ESA geoeconomic zones make sense on multiple level. As discussed in the QNE on Namibia, the small proportion of domestic listed only stocks in the index, RND is actually the least diverse of the constructed geoeconomic zones, dominating Namibia in size and responsible for the common monetary area they both belong to. Combining the two zones also makes the regional IP statistically significant, and to the 1% level.

The FEVD tables illustrate an additional reason for combining the groups. The proportion of variance contributed by the LSI lagged shock to itself is 90.4 to 91.6% respectively in RND and ESA in contrast to the 96% in in ECO. That contribution level in RND is fairly constant between period 2 of the forecast horizon to the end. In ESA the contribution level starts above 97% in period dropping in every during the forecast horizon. The forecasted IRF graphs below shows a comparison between ECO and the more reflective combined group of ESA+ RND.

2.6 Conclusions

In this section we conclude with a summary of inferences and conclusion we have drawn from the discussion of results in the previous section. We also highlight patterns that could be useful to policy makers and a further research avenue.

Our hypotheses considers whether source of external shocks matter and if the regional and institutional stance matter for the market resilience of a sample of public equity risk price aggregates in Africa and on African stock exchanges. We found that the GFCy variants from EU and China are not as strong as the GFCy proper emanating from the US. China still does not exert a statistically significant direct impact on equity prices in Africa. We find that changes in the Local Real Rate at a one period lag is factor only for the US specification of our model, the EU and China specifications did not meet the stability condition with this variable included. The ECB rate having been below the zero lower bound during the period could explain the some of its apparent impact.

We do also find that market size, concentration, historical legal origin and income status are, with the constraints we placed, of some explanatory value and strongly hint at the importance of structural elements of the financing ecosystem. All 4 geoeconomic zones we constructed respond differently than expected to the changes in the global common factor for risky assets, and the final 2 we compare respond differently to each other. The response of ECOWAS region is characterised by seemingly longer run effect and surprisingly shows a more persistent impact from

the CHN real channel. Our expectation was that this might be a feature of the COMESA group combining 4 ESA-countries with the 2 RND countries. There are common monetary areas within the combined COMESA group and ECOWAS group might inform future research.

Appendix B

Table 2.11: Democratic event register for sample countries during sample period

Table [] Register of Elections and Democratc Events and Democracy Freedom Status variable

country	*Month of elections and/or democratic events*	*Democoracy Freedom Status 2002-19*
CIV	2010m10-11, 2011m12, 2015m10	Not Free,
	2016m10, m12, 2018m10	Partly Free (2012-)
EGY	2005m7, 2010m6,m11, 2011m11-12,	Not Free, Partly Free
	2006m9, 2012m1-2, m5-6, 2014m1,m5, 2015m10-11, 2018m3	(2012), Not Free (2013-)
MAR	2009m6, 2011m7,m11,	Partly Free
	2015m9, 2016m10,	
KEN	2005m11, 2007m12, 2010m8	Partly Free
	2013m3, 2017m8,m10	
MUS	2005m7, 2010m5, 2014m12	Free
BWA	2004m10, 2009m10, 2014m10	Free
	2019m10	
NAM	2004m11, 2009m11, 2010m11	Free
	2014m11, 2015m11, 2019m11	
ZAF	2004m4, 2009m4, 2014m5	Free
	2016m8, m11, 2019m5	
ZMB	2006m9, 2011m9, 2015m1	Partly Free
	2016m8, 2019m4	
NGA	2007m4, 2011m4, m12, 2012m2-3, m7, m11, 2013m11	Partly Free
	2014m6, 2015m3, m11-12, 2016m1,4,7,9,11,12, 2017m11, 2018m7,m9, 2019m2-3, m11	
GHA	2004m12, 2008m12, 2012m12	Not Free, Partly Free
	2016m12	(2012), Not Free (2013-)

Note: This table is a register listing the month of elections and democratic events that occurred in the sample countries during the sample period. Data compiled by the author from national sources. The table also lists the status and year of change in the Freedom House Democracy Freedom Status (DFS) variable for each country in the sample between 2002 and 2019. The source of this data is Freedom in the World (2020). DFS is determined by the combination of equal weighted overall scores of political rights and civil liberties which is then converted into one of 3 states (Free, Partly Free, Not Free). Years and months in red in the register correspond to Years in which there was a change in DFS

Table 2.12: Description of VAR model variables and data sources

Table [] Data sources and descriptions of VAR model variables and parameters

	Variable	No. of proxies or variants	Variable description (changes at monthly frequency)	Sources
Global block (GFCy and kGFCy)	Global Risk Appetite (Volatility Indexes)	4	VIX, V2X, VFTSE, VAS	Chicago Board of Exchange, downloaded from Bloomberg
		1	Global Common Factor for Risky Assets	Miranda-Agrippino, Nenova and Rey (2022)
	Global Liquidity (Effective Liqudity Rates)	4	Fed Funds rate, ECB rate, BoE rate, PBoC rate	Federal Reserve Board Statistics Database, Bank of England Database, European Central Bank Statistical Data Warehouse, Bank of International Settlements Statistics Database
Country block		14	Local Stock Index price series	Bloomberg, Thomson Reuters, Databank (Ghana)
		11	Local Monetary Policy Rates	Central Banks, IMF International Financial Statistics Database
		11 x 2	Local Currency to USD, Euro (end of period)	IMF International Financial Statistics Database
		11 x 1	ex-post Local Real Rate: Local Monetary Policy Rates - Local Consumer Price Inflation	authors calculations IMF International Financial Statistics Database
Regional block		6	Industrial Production, regional: MNA, SSA, CFA, ECO, ESA, ZAR	IMF International Financial Statistics Database AfDB African Economic Outlook Database, World Economic Outlook Database China Africa Research Initiative Chines Loans to Africa Database
Growth component (proxies and drivers)		4	Industrial Production, key economies: US, EU, CHN, World	IMF International Financial Statistics Database IMF Direction of Trade Statistics Database
		9	Key Commodity prices, (USD, Euro where relevant) diamonds, platinum, gold, copper, oil, cocoa, wheat, rice	Bloomberg UN Conference on Trade and Development (UNCTAD) Statistiics Database

Note: This table contains a full list describing variables considered and used in the pVAR models with their sources.

Tables 2.13: Combined (3, 2 key bloc) broad specification pVAR GMM estimation tables

GMM Estimation	*No. of obs = 1696*					
US specification	*No. of panels = 11*					
(a)	*Ave. no. of T = 154.182*					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.14463	0.03382	***	4.28	0.07835	0.211
Δ in log of VIX, t-1	-0.01577	0.00712	**	-2.21	-0.02972	-0.002
Δ in Fed Funds, t-1	3.09305	0.9796	***	3.16	1.17306	5.013
Δ in ex-post Local Real Rate, t-1	-0.0003	0.00014	**	-2.2	-0.00057	-3E-05
Δ in Regional IP1, t-1	0.02244	0.00662	***	3.39	0.00947	0.035
Δ in US IP, t-1	1.36086	0.28792	***	4.73	0.79654	1.925
Δ in key commodity (t-1)	0.05377	0.02163	**	2.49	0.01137	0.096

GMM Estimation	*No. of obs = 1627*					
CHN specification	*No. of panels = 11*					
(b)	*Ave. no. of T = 147.909*					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.14578	0.03651	***	3.99	0.07423	0.217
Δ in log of VAS, t-1	-0.01683	0.00926	*	-1.82	-0.03497	0.001
Δ in PBoC rate, t-1	0.78498	0.20261	***	3.87	0.38788	1.182
Δ in ex-post Local Real Rate, t-1	-0.00038	0.00015	**	-2.48	-0.00069	-8E-05
Δ in Regional IP1, t-1	0.04655	0.02495	*	1.87	-0.00235	0.095
Δ in CHN IP, t-1	0.13183	0.03728	***	3.54	0.05877	0.205
Δ in key commodity (t-1)	0.03554	0.01569	**	2.27	0.00479	0.066

GMM Estimation	*No. of obs = 1696*					
EUR specification	*No. of panels = 11*					
(c)	*Ave. no. of T = 154.182*					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.14949	0.03574	***	4.18	0.07945	0.22
Δ in log of V2X, t-1	-0.01461	0.00924		-1.58	-0.03272	0.004
Δ in ECB rate, t-1	3.83057	1.54975	**	2.47	0.79311	6.868
Δ in ex-post Local Real Rate, t-1	-0.0003	0.00014	**	-2.22	-0.00057	-3E-05
Δ in Regional IP1, t-1	0.01985	0.00639	***	3.1	0.00732	0.032
Δ in EU IP, t-1	0.30167	0.13572	**	2.22	0.03566	0.568

Note: This table contains reports the results pVAR GMM estimations prior to forecasting the IRFs in figures 2.7 panels (a, b, c) and 2.8 panels (a, b)

Table 2.14: Three key bloc broad specification FEVD tables

Response to a one unit shock in US impulse variables

(a)

US IRFs		***Impulse Variables***					
Response Variable of interest	***Forecast Horizon***	**Δ in log LSI (t-1)**	**Δ in ex-post LRR (t-1)**	**Δ in log of ViX (t-1)**	**Δ in Fed Funds (t-1)**	**Δ in Reg IP1 (t-1)**	**Δ in US IP (t-1)**
Δ in log of Local Stock Index	0	0	0	0	0	0	0
	1	1	0	0	0	0	0
	2	0.964596	0.002836	0.001975	0.004013	0.00156	0.02502
	3	0.954417	0.002803	0.006115	0.004085	0.001541	0.03104
	4	0.949276	0.003223	0.009553	0.004068	0.001532	0.03235
	5	0.946341	0.003482	0.011646	0.004055	0.001527	0.032949
	6	0.944675	0.003641	0.01286	0.004047	0.001525	0.033251
	7	0.943734	0.003733	0.01355	0.004043	0.001524	0.033416
	8	0.943202	0.003786	0.01394	0.004041	0.001523	0.033509
	9	0.942901	0.003815	0.014161	0.004039	0.001523	0.03356
	10	0.942732	**0.003832**	**0.014286**	0.004039	0.001523	**0.03359**

Response to a one unit shock in impulse variables

(b)

CHN IRFs		***Impulse Variables***					
Response Variable of interest	***Forecast Horizon***	**Δ in log LSI (t-1)**	**Δ in ex-post LRR (t-1)**	**Δ in log of VAS (t-1)**	**Δ in PBoC rate (t-1)**	**Δ in Reg IP1 (t-1)**	**Δ in CHN IP (t-1)**
Δ in log of Local Stock Index	0	0	0	0	0	0	0
	1	1	0	0	0	0	0
	2	0.98099	0.002511	0.005421	0.004624	0.001441	0.005012
	3	0.975651	0.002539	0.005456	0.004618	0.001433	0.010305
	4	0.971339	0.002527	0.005431	0.004598	0.001505	0.0146
	5	0.967935	0.002519	0.005425	0.004581	0.001521	0.018018
	6	0.965243	0.002512	0.005417	0.004568	0.001545	0.020716
	7	0.963116	0.002507	0.005411	0.004558	0.001559	0.022849
	8	0.961432	0.002502	0.005406	0.00455	0.001572	0.024537
	9	0.960099	0.002499	0.005403	0.004543	0.001582	0.025874
	10	0.959042	**0.002496**	**0.0054**	0.004538	0.00159	**0.026934**

Response to a one unit shock in impulse variables

(c)

EU IRFs		***Impulse Variables***					
Response Variable of interest	***Forecast Horizon***	**Δ in log of LSI (t-1)**	**Δ in ex-post LRR (t-1)**	**Δ in log of V2X (t-1)**	**Δ in ECB rate (t-1)**	**Δ in Reg IP1 (t-1)**	**Δ in EU IP (t-1)**
Δ in log of Local Stock Index	0	0	0	0	0	0	0
	1	1	0	0	0	0	0
	2	0.984226	0.002212	0.006132	0.003377	0.001535	0.002518
	3	0.978871	0.002398	0.010671	0.003468	0.001553	0.003039
	4	0.976044	0.00256	0.012983	0.003468	0.001562	0.003384
	5	0.974713	0.002624	0.014103	0.003466	0.001565	0.00353
	6	0.97407	0.002656	0.014639	0.003466	0.001566	0.003603
	7	0.973762	0.002671	0.014897	0.003465	0.001567	0.003638
	8	0.973615	0.002679	0.01502	0.003465	0.001567	0.003655
	9	0.973544	0.002682	0.015079	0.003465	0.001567	0.003663
	10	0.97351	**0.002684**	**0.015108**	0.003465	0.001567	0.003667

Note: This table contains the results of FEVD of the forecasted IRFs in figures 2.7 panels (a, b, c)

Table 2.15: Two key bloc broad key commodity specification FEVD tables

(a)

Response to a one unit shock in US impulse variables

US IRFs		***Impulse Variables***					
Response Variable of interest	***Forecast Horizon***	**Δ in log LSI (t-1)**	**Δ in ex-post LRR (t-1)**	**Δ in log of ViX (t-1)**	**Δ in Fed Funds (t-1)**	**Δ in Reg IP1 (t-1)**	**Δ in Key Comm (t-1)**
Δ in log of Local Stock Index	0	0	0	0	0	0	0
	1	1	0	0	0	0	0
	2	0.980133	0.003902	0.005189	0.004626	0.001691	0.004459
	3	0.97453	0.005177	0.009004	0.004677	0.001689	0.004923
	4	0.972014	0.005693	0.011008	0.004665	0.001684	0.004937
	5	0.970813	0.005906	0.012007	0.004659	0.001682	0.004932
	6	0.970227	0.006008	0.012498	0.004656	0.001682	0.00493
	7	0.969942	0.006057	0.012737	0.004655	0.001681	0.004928
	8	0.969803	0.006081	0.012854	0.004654	0.001681	0.004927
	9	0.969735	0.006092	0.012912	0.004654	0.001681	0.004927
	10	0.969702	**0.006098**	**0.012939**	0.004653	0.001681	**0.004927**

(b)

Response to a one unit shock in impulse variables

CHN IRFs		***Impulse Variables***					
Response Variable of interest	***Forecast Horizon***	**Δ in log LSI (t-1)**	**Δ in ex-post LRR (t-1)**	**Δ in log of VAS (t-1)**	**Δ in PBoC rate (t-1)**	**Δ in Reg IP1 (t-1)**	**Δ in Key Comm (t-1)**
Δ in log of Local Stock Index	0	0	0	0	0	0	0
	1	1	0	0	0	0	0
	2	0.977969	0.002216	0.006569	0.004698	0.001475	0.007073
	3	0.976462	0.002587	0.006603	0.004722	0.001498	0.008129
	4	0.976348	0.002605	0.00664	0.004723	0.001514	0.00817
	5	0.976341	0.002607	0.00664	0.004723	0.001515	0.008174
	6	0.976341	0.002607	0.00664	0.004723	0.001515	0.008174
	7	0.976341	0.002607	0.00664	0.004723	0.001515	0.008174
	8	0.976341	0.002607	0.00664	0.004723	0.001515	0.008174
	9	0.976341	0.002607	0.00664	0.004723	0.001515	0.008174
	10	0.976341	**0.002607**	**0.00664**	0.004723	0.001515	**0.008174**

Note: This table contains the results of FEVD of the forecasted IRFs in figures 2.8 panels (a, b)

Table 2.16: pVAR GMM style estimations by de facto exchange rate regimes

(a) Regime 5

GMM Estimation	*No. of obs = 27*					
sample : freely falling exchange	*No. of panels = 1*					
rate regime	*Ave. no. of T = 27.000*					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	-0.15061	0.20877		-0.72	-0.55979	0.25857
Δ in log of VIX, t-1	0.02107	0.03582		0.59	-0.04913	0.09127
Δ in ex-post Local Real Rate, t-1	0.00688	0.01831		0.38	-0.029	0.04277
Δ in key commodity (t-1)	0.21858	0.15356		1.42	-0.08238	0.51955

(b) Combined grouping of regimes from 3 to 1

GMM Estimation	*No. of obs = 1710*					
sample : managed floating to	*No. of panels = 11*					
currency board exch rt regimes	*Ave. no. of T = 155.455*					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.16496	0.03519	***	4.69	0.09598	0.23393
Δ in log of VIX, t-1	-0.01213	0.00772		-1.57	-0.02726	0.00301
Δ in ex-post Local Real Rate, t-1	-0.00038	0.00015	***	-2.58	-0.00067	-9.1E-05
Δ in key commodity (t-1)	0.05585	0.02206	**	2.53	0.01261	0.0991

(c) Regime 3

GMM Estimation	*No. of obs = 417*					
sample : de facto exch rt regs 3	*No. of panels = 5*					
	Ave. no. of T = 83.4					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.17445	0.05861		2.98	0.05957	0.28932
Δ in log of VIX, t-1	-0.01312	0.01075		-1.22	-0.03418	0.00795
Δ in ex-post Local Real Rate, t-1	-0.00026	0.00017	*	-1.53	-0.00059	7.2E-05
Δ in key commodity (t-1)	0.04594	0.04853	*	0.95	-0.04917	0.14105

(d) Regime 2

GMM Estimation	*No. of obs = 866*					
sample : de facto exch rt regs 2	*No. of panels = 7*					
	Ave. no. of T = 123.714					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.18997	0.04982	***	3.81	0.09233	0.28762
Δ in log of VIX, t-1	-0.01808	0.01337		-1.35	-0.04429	0.00814
Δ in ex-post Local Real Rate, t-1	-0.00042	0.00014	***	-2.88	-0.0007	-0.00013
Δ in key commodity (t-1)	0.04235	0.03449	*	1.23	-0.02524	0.10995

(e) Regime 1

GMM Estimation	*No. of obs = 427*					
sample : de facto exch rt regs 1	*No. of panels = 3*					
	Ave. no. of T = 142.333					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.08695	0.06252		1.39	-0.03559	0.20948
Δ in log of VIX, t-1	-0.0017	0.01226		-0.14	-0.02572	0.02232
Δ in ex-post Local Real Rate, t-1	0.00014	0.00033		0.42	-0.00051	0.00078
Δ in key commodity (t-1)	0.08652	0.0316	***	2.74	0.02458	0.14846

Note: This table reports the results pVAR GMM estimations for all 5 de facto exchange rate regimes that are present in the sample during the period, panel (a) and panel (d) are related to the forecasted IRFs figure 2.9.

Table 2.17: Full panel broadest specification pVAR GMM estimation table

GMM Estimation	*No. of obs = 1541*					
broad specification	*No. of panels = 11*					
	Ave. no. of T = 140.091					
Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.15946	0.03415	***	4.67	0.09253	0.2264
Δ in log of GCFRA, t-1	-0.00945	0.00584		-1.62	-0.02089	0.00199
Δ in ex-post Local Real Rate, t-1	1.3E-05	0.00013		0.1	-0.00024	0.00026
Δ in Regional IP1, t-1	0.01756	0.00635	***	2.77	0.00511	0.03
Δ in Regional IP2, t-1	0.03407	0.03256		1.05	-0.02974	0.09788
Δ in US IP, t-1	0.89737	0.2846	***	3.15	0.33957	1.45517
Δ in EU IP, t-1	0.08296	0.14434		0.57	-0.19994	0.36586
Δ in CHN IP, t-1	0.0473	0.03718	***	1.27	-0.02557	0.12017

Note: This table reports the results of pVAR GMM estimations for the 5 de facto exchange rate regimes that are present in the sample during the period using monthly data from multiple sources listed in table 2.11 from 2003m12 to 2017m6

Table 2.18: Full panel broadest specification FEVD table

Responses one unit shock in Global Common Factor from Risky Assets, Local Real Rates and all growth proxies

full panel		***Impulse Variables***							
Response Variable of interest	*Forecast Horizon*	**Δ in log LSI (t-1)**	**Δ in log gcfra (t-1)**	**Δ in ex-post LRR (t-1)**	**Δ in Reg IP1 (t-1)**	**Δ in Reg IP2 (t-1)**	**Δ in US IP (t-1)**	**Δ in EU IP (ti1)**	**Δ in CHN IP (t-1)**
Δ in log of Local Stock Index	0	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0	0
	2	0.97963	0.000289	4.17E-06	0.001588	0.000482	0.0107	0.000217	0.00709
	3	0.973983	0.00046	9.04E-06	0.001629	0.000521	0.0137	0.000239	0.009459
	4	0.972676	0.000488	1.05E-05	0.001638	0.000527	0.014373	0.000272	0.010016
	5	0.972377	0.000496	1.09E-05	0.001639	0.000527	0.014529	0.000273	0.010148
	6	0.972311	0.000498	1.09E-05	0.001639	0.000527	0.014562	0.000275	0.010177
	7	0.972296	0.000498	0.000011	0.001639	0.000527	0.01457	0.000275	0.010184
	8	0.972293	0.000498	0.000011	0.001639	0.000527	0.014572	0.000275	0.010185
	9	0.972292	0.000498	0.000011	0.001639	0.000527	0.014572	0.000275	0.010185
	10	0.972292	0.000498	0.000011	0.001639	0.000527	0.014572	0.000275	0.010186

Note: This table contains the results of FEVD of the forecasted IRFs in figures 2.8 panels (a, b)

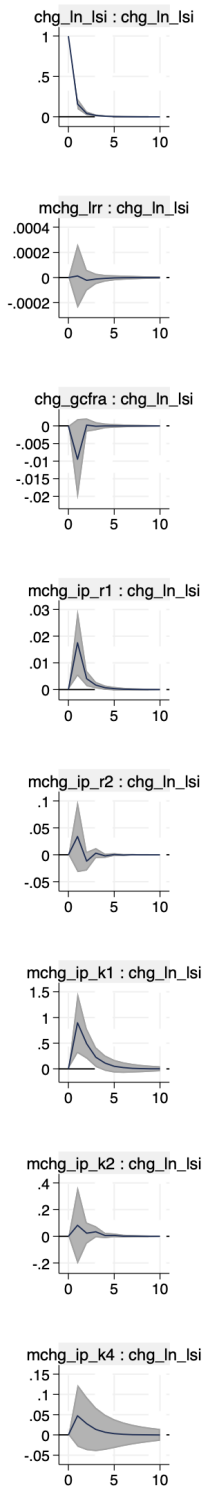


Figure 2.12: Full panel IRF - LSI response to global risk factor, regional and key bloc impulse variables

Note: The figures in panel (a) traces the forecasted IRF of the LSI to a one unit shock in the GCFRA all other impulse variables using monthly data from multiple sources listed in table 2.11 from 2003m12 to 2017m6

Tables 2.19: Four Geoeconomic zone Pvar GMM estimation tables

No. of obs = 568
ECO *No. of panels = 4*
Ave. no. of T = 142.000

Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.24268	0.04867	***	4.99	0.14729	0.33807
Δ in log of GCFRA, t-1	0.0137	0.00929		1.47	-0.00451	0.0319
Δ in ex-post Local Real Rate, t-1	-8.1E-05	0.00011		-0.77	-0.00029	0.00013
Δ in Regional IP1, t-1	0.00645	0.00591		1.09	-0.00514	0.01804
Δ in US IP, t-1	-0.23581	0.38954		-0.61	-0.99929	0.52766
Δ in EU IP, t-1	-0.08246	0.22934		-0.36	-0.53196	0.36705
Δ in CHN IP, t-1	0.09271	0.04861	*	1.91	-0.00257	0.18799

No. of obs = 294
RND *No. of panels = 2*
Ave. no. of T = 147.000

Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	-0.04165	0.07604		-0.55	-0.19069	0.10739
Δ in log of GCFRA, t-1	-0.02205	0.01486		-1.48	-0.05117	0.00707
Δ in ex-post Local Real Rate, t-1	0.00112	0.00089		1.26	-0.00063	0.00288
Δ in Regional IP1, t-1	-0.10515	0.11693		-0.9	-0.33433	0.12403
Δ in US IP, t-1	2.16666	0.67801	***	3.2	0.83778	3.49553
Δ in EU IP, t-1	0.43814	0.30166		1.45	-0.15309	1.02938
Δ in CHN IP, t-1	-0.00326	0.00968		-0.34	-0.02224	0.01572

No. of obs = 691
ESA *No. of panels = 5*
Ave. no. of T = 138.200

Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.13661	0.05198	***	2.63	0.03474	0.23849
Δ in log of GCFRA, t-1	-0.01367	0.00905		-1.51	-0.0314	0.00406
Δ in ex-post Local Real Rate, t-1	-7.7E-05	0.00029		-0.26	-0.00065	0.00049
Δ in Regional IP1, t-1	0.02455	0.00435	***	5.64	0.01602	0.03309
Δ in US IP, t-1	0.89232	0.42699	**	2.09	0.05544	1.7292
Δ in EU IP, t-1	0.00693	0.21597		0.03	-0.41637	0.43023
Δ in CHN IP, t-1	0.17159	0.05102	***	3.36	0.0716	0.27158

No. of obs = 985
ESA+RND *No. of panels = 7*
Ave. no. of T = 140.714

Δ in log of Local Stock Index, t	coefficient	st'd error	sig	z-stat	[95% conf.	interval]
Δ in log of Local Stock Index, t-1	0.11779	0.04423	***	2.66	0.03109	0.20449
Δ in log of GCFRA, t-1	-0.02051	0.00749	**	-2.74	-0.03519	-0.00583
Δ in ex-post Local Real Rate, t-1	3E-05	0.00028		0.11	-0.00052	0.00058
Δ in Regional IP1, t-1	0.02793	0.00399	***	7	0.02011	0.03575
Δ in US IP, t-1	1.46073	0.37119	***	3.94	0.73322	2.18825
Δ in EU IP, t-1	0.21025	0.17775		1.18	-0.13814	0.55864
Δ in CHN IP, t-1	0.04023	0.03734		1.08	-0.03296	0.11343

Note: This table contains the results of pVAR GMM estimations, in panels (a, b, c, d), prior to forecasting the IRFs in figure 2.13 below

Table 2.20: Four Geoeconomic zone FEVD tables

gz ID: ECO *Response to a one unit shock in impulse variables*
[a]
Impulse Variables

Response Variable of interest	*Forecast Horizon*	Δ in log LSI (t-1)	Δ in log gcfra (t-1)	Δ in ex-post LRR (t-1)	Δ in Reg IP1 (t-1)	Δ in US IP (t-1)	Δ in EU IP (t(1)	Δ in CHN IP (t-1)
Δ in log of Local Stock Index	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0
	2	0.990176	0.003594	0.000089	0.000388	0.00097	6.96E-05	0.004714
	3	0.983521	0.003766	0.000251	0.000402	0.000961	0.000129	0.01097
	4	0.977741	0.003984	0.000359	0.000403	0.001068	0.000134	0.01631
	5	0.973078	0.004124	0.000436	0.000402	0.001236	0.000159	0.020565
	6	0.969393	0.004242	0.000494	0.000401	0.001392	0.000171	0.023907
	7	0.966497	0.004332	0.000539	0.0004	0.001521	0.000184	0.026526
	8	0.964222	0.004405	0.000575	0.0004	0.001624	0.000193	0.028583
	9	0.962433	0.004461	0.000602	0.000399	0.001706	0.0002	0.030198
	10	0.961027	0.004506	0.000624	0.000399	0.00177	0.000206	0.031469

gz ID: RND *Response to a one unit shock in impulse variables*
[c]
Impulse Variables

Response Variable of interest	*Forecast Horizon*	Δ in log LSI (t-1)	Δ in log gcfra (t-1)	Δ in ex-post LRR (t-1)	Δ in Reg IP1 (t-1)	Δ in US IP (t-1)	Δ in EU IP (t(1)	Δ in CHN IP (t-1)
Δ in log of Local Stock Index	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0
	2	0.906729	0.003016	0.002002	0.001731	0.080898	0.005451	0.000173
	3	0.904941	0.003294	0.002382	0.00173	0.08144	0.005623	0.00059
	4	0.904196	0.003368	0.002387	0.001736	0.081913	0.005806	0.000594
	5	0.904143	0.003372	0.002389	0.001736	0.081946	0.005817	0.000598
	6	0.904132	0.003373	0.002389	0.001736	0.08195	0.005822	0.000598
	7	0.904131	0.003373	0.002389	0.001736	0.081951	0.005822	0.000598
	8	0.904131	0.003373	0.002389	0.001736	0.081951	0.005823	0.000598
	9	0.904131	0.003373	0.002389	0.001736	0.081951	0.005823	0.000598
	10	0.904131	0.003373	0.002389	0.001736	0.081951	0.005823	0.000598

gz ID: ESA *Response to a one unit shock in impulse variables*
[b]
Impulse Variables

Response Variable of interest	*Forecast Horizon*	Δ in log LSI (t-1)	Δ in log gcfra (t-1)	Δ in ex-post LRR (t-1)	Δ in Reg IP1 (t-1)	Δ in US IP (t-1)	Δ in EU IP (t(1)	Δ in CHN IP (t-1)
Δ in log of Local Stock Index	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0
	2	0.974851	0.000991	1.58E-06	0.002541	0.008927	8.78E-05	0.0126
	3	0.958635	0.001732	1.35E-05	0.002616	0.011435	0.00017	0.0254
	4	0.94672	0.002052	5.68E-05	0.002596	0.012452	0.000279	0.035845
	5	0.937536	0.002328	0.000105	0.00258	0.01301	0.000331	0.04411
	6	0.930373	0.002534	0.000148	0.002566	0.013389	0.000379	0.050612
	7	0.924756	0.002697	0.000183	0.002555	0.013671	0.000413	0.055726
	8	0.920335	0.002824	0.00021	0.002546	0.013889	0.000441	0.059755
	9	0.916847	0.002925	0.000233	0.002539	0.01406	0.000463	0.062934
	10	0.914089	0.003004	0.00025	0.002534	0.014194	0.00048	0.065448

gz IDs: ESA + RND *Response to a one unit shock in impulse variables*
[d]
Impulse Variables

Response Variable of interest	*Forecast Horizon*	Δ in log LSI (t-1)	Δ in log gcfra (t-1)	Δ in ex-post LRR (t-1)	Δ in Reg IP1 (t-1)	Δ in US IP (t-1)	Δ in EU IP (t(1)	Δ in CHN IP (t-1)
Δ in log of Local Stock Index	0	0	0	0	0	0	0	0
	1	1	0	0	0	0	0	0
	2	0.95903	0.002768	1.92E-05	0.00248	0.027425	0.001095	0.007183
	3	0.952413	0.00308	9.83E-05	0.002586	0.032096	0.001087	0.00864
	4	0.951169	0.003076	0.000111	0.002589	0.033007	0.001159	0.008889
	5	0.950939	0.003079	0.000114	0.002591	0.03318	0.001159	0.008939
	6	0.950895	0.003079	0.000114	0.002591	0.033213	0.001161	0.008947
	7	0.950886	0.003079	0.000114	0.002591	0.033219	0.001161	0.008949
	8	0.950885	0.003079	0.000114	0.002591	0.03322	0.001161	0.00895
	9	0.950884	0.003079	0.000114	0.002591	0.033221	0.001161	0.00895
	10	0.950884	0.003079	0.000114	0.002591	0.033221	0.001161	0.00895

Note: This table contains the results of FEVD, in panels (a, b, c, d), corresponding to the forecasted IRFs in figure 2.13 below

(a) ECO (b) ESA (c) RND (d) ESA + RND

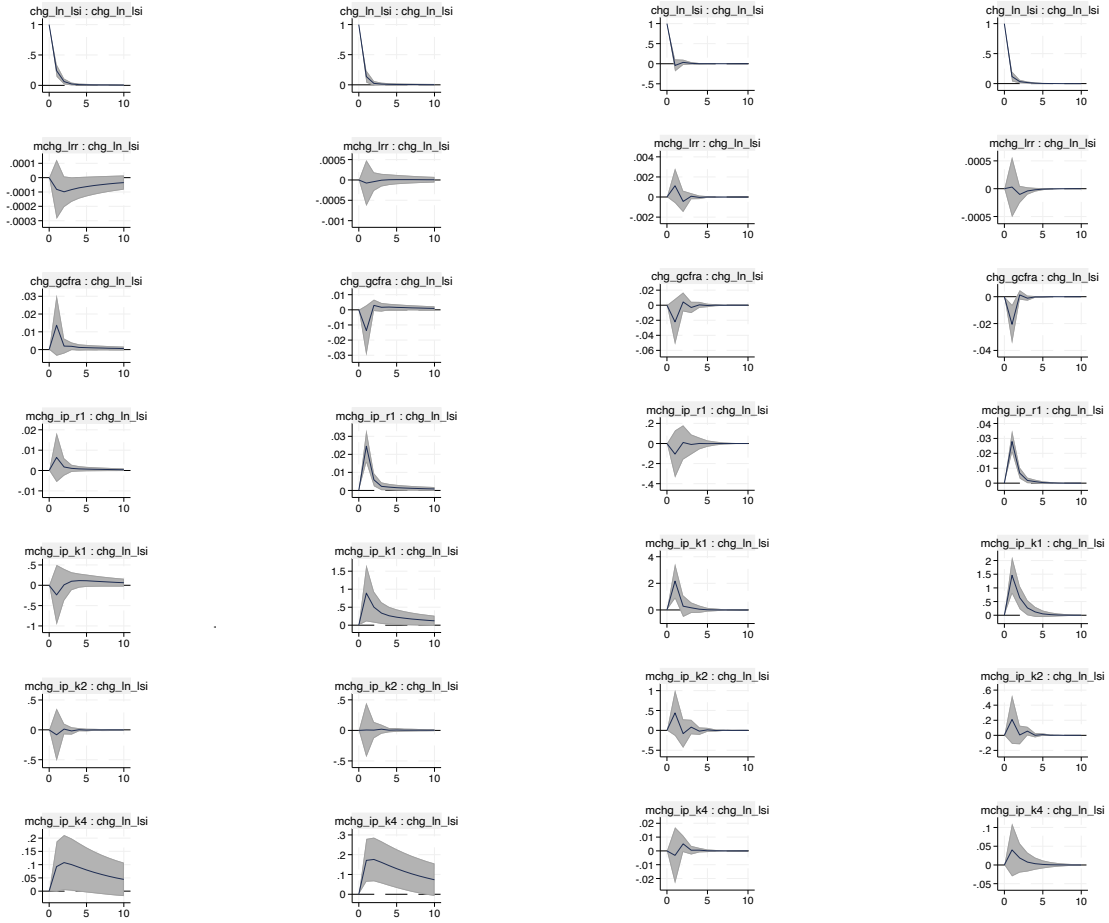


Figure 2.13: All geoeconomic zone sub panels IRFs

Note: This figure traces the IRF of the LSI of 4 sub panels to one unit shock in the GCFRA all other impulse variables using monthly data from multiple sources listed in table 2.12 from 2003m12 to 2017m6

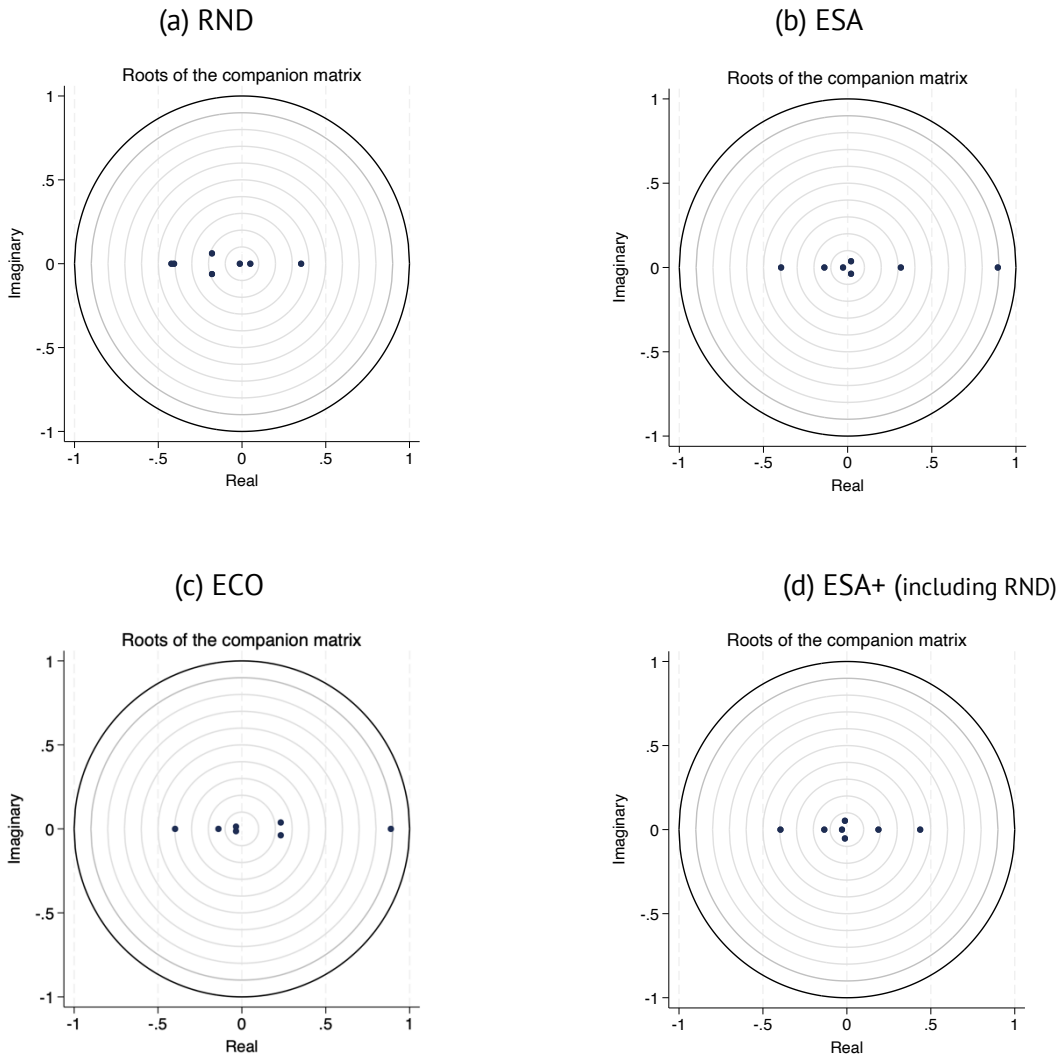


Figure 2.14 : Eigenvalue stability condition for panel VARS by geoeconomic zone

Note: As all eigenvalues lie within the unit circles, the panel VARs of each zone satisfy the stability condition.

To exploit the broadest range of relevant variables in our data set, we initially attempt to predict orthogonalised impulse response functions (OIRFs) with confidence intervals computed using 1000 Monte Carlo iterations. However, to we made the choice to forgo the Cholesky ordering required for OIRFs and selection order criteria due to system stability challenges. Our resultant intuitive ordering assumptions are discussed throughout. As a table with a fuller list describing variables considered and used in the pVAR models with sources.

The stability challenge stems from how we had applied 2 of 6 regional growth proxies to each of the 11 sample countries in the data set (ref appendix?). Addressing this required a pivot in approach. In the pursuit of parsimony we reduce the choice set, and to maintain focus we relax the constraint/assumption orthoginalisation demands. The subsequent impulse response functions (IRFs) were predicted using 250 Monte Carlo iterations, starting with a set of broad specifications that allow us to impose some structural assumptions, if not restrictions, to test our hypotheses.

Chapter III: *A proposal for capital market development in Africa: A geoeconomic solution to a macro-financial trilemma*

'the breaking of a wave cannot explain the whole sea'
- Vladimir Nabokov –
'you can't stop the waves, but you can learn to surf'

3.1 Introduction

Over the past two decades the emerging market (EM) and frontier market (FM) investment opportunity has expanded due broadly stronger institutions, diversification of growth drivers and advances in technology. However, those decades not only included global economic and financial shock events but also the emergence of a multipolar geopolitical landscape. For the emerging and developing economies (EMDEs) in Africa, the risks of fragmentation and double-edged sword of regionalisation, posing a set of challenges that could be addressed by innovation from both policy makers and private sector participants. Improving institutional capacity and managing sustainable economic growth while harnessing the changes to be wrought by technology on individuals and industries confronts African economies acutely while the globalisation trend of previous decades finds a new level.

Through the particular lens of global financial markets, made narrower still with a focus on public equity capital market resilience, we see a macro financial geopolitical trilemma facing Africa, as an economic bloc, in the global competition for needed risk capital. The policy space within which it needs be addressed spans from the real economy and industrial strategy to aspects of the political domain, whether in terms of policy orientation or political alignments . The dynamics of institutional change and development in a global economy more prone to shocks therefore have a range of implications when considering the historical perspective, the current state and scenarios for future outcomes.

Managing these dynamics requires cognisance of global trends and adapting to domestic realities. On one hand, technology is reconfiguring the institutional organisation of financial activities towards an increasingly payment-centric and data driven landscape. But the comparatively low levels of aggregate savings in Africa – a long term average of 15% of GDP - means that foreign inflows are set to remain important for financial markets.

While Africa represents 17% of the global population it is only responsible for 3% of global gross domestic product. Increasing global and regional trade integration and economic complexity at national and regional levels will require the unlocking of (the supply and demand for) capital. Africa's resource endowment includes many of the critical minerals that are essential inputs for green technologies required for decarbonisation and energy transition efforts, and has the potential to change global trade patterns. The strategic use of them to drive more inclusive growth in Africa requires higher value added participation in global value chains.

There is a commercial opportunity to be seized and geoeconomic tactic to be pursued in focussing on developing a pan African investment culture with respect to equity finance in particular. The longer term perspective and risk appetite required to do so could help mobilise regional institutional savings pools. A regionally integrated capital market could become effective channel for disseminating a needed narrative of the common wealth on the continent in the right circumstances. It could play a key role influencing economic growth through multiple channels. As a platform it offers the opportunity for effective capital allocation and the diversification of risk by facilitating deployment of capital towards important industries and priority sectors. It could create a virtuous circle of improved risk perceptions and higher levels of patient capital from local and external investors, which would increase the stability of regional capital markets.

But this causes us to ponder a number of questions. If desirable, does regional economic resilience requires an enhanced level of regional financial market integration? If growth in EM capital markets and investment banking is likely to driven by the equitization of corporate assets, have recent public capital market developments and structural initiatives been sufficient, and if not what else is necessary? Can recent trends in private capital market flows and corporate activity indicate whether it is more likely to be supportive predictive of future issuance on a pan African basis or on a regional or financial centre basis? And if so, what are the likely paths and challenges to be encountered in order for this outcome to be best targeted directly?

In this paper, we discuss a set of policy prescriptions for the risks and opportunities faced by Africa with the benefit of a differential diagnosis from consolidating analysis in previous chapters. We use the comparisons of the relationships between the financial market prices of risk assets in and within Africa and global and regional factors through time to establish the basis for a regional capital development strategy. Through a tapered view of existing and emergent institutional structures we assess the possibility, plausibility and probability of a policy solution.

We present a discursive path to a policy suggestion. It is deeply informed by rich vein of literature on a core set of theories at the intersection of macroeconomics and political economy – the impossible trinity of the standard open economy trilemma and the paradox of globalisation in the political economy trilemma. With the additional influence of recent scholarly contributions of

frameworks of a financial globalisation institutional supercycle, geoeconomics and considerations of a future paradigm for monetary arrangements we present an integrated theory model to justify the (possible) policy prescriptions and assess (plausible and probable) optimal solutions.

While our narrow lens remains specifically focussed on equity listed on selected domestic public capital markets on the continent, we further explore the intersection of other regional and institutional dimensions impacting the creation and supply of risk assets in Africa. We consider the economic context in the evolving aggregate depth of capital markets and the pool of capital in the regional financial ecosystem, that of course interacts with the global financial system.

By extension, we further aim to validate a commercial opportunity in pan African asset/investment management presenting evidence about the regional financial ecosystem and strategic landscape. In previous chapters we analysed a sample of eleven capital markets covering a critical mass - by size, value and influence - of a heterogenous set of middle income African economies. We find there are institutional ingredients and investment ecosystem requirements to support an innovation and reform agenda.

We propose there is an important role equity capital markets can play in the geoeconomic arena for Africa. Historical lessons about the sudden stops in capital flows and capital flight include their high cost association. More recent experience with external shocks, efforts to 'build back better' post-pandemic, or critical supply chains affected by conflict, all point to the [more robust] challenge that has emerged in terms of how nations interact and pursue their interests.

The use of a countries' economic strength, derived from its existing finance and trade networks, to achieve economic and geopolitical objectives is the definition of geoeconomics in the formal framework developed by Clayton, Maggiori and Schreger (2023). The concept of governing through financial markets is explored by Braun, Gabor and Hübner (2018) in an analogous context. It is defined as engineering financial instruments and repurposing markets, during a period of evolutionary change in the global macrofinancial system, as an instrument of statecraft. A pan African regional capital market of significant size could be an effective tool of collective self-reliance.

In the next section we discuss and empirically frame historical and current context to justify the intentionality in policy design for a set of middle income countries in Africa. We proceed to discussing the particular institutional ingredients, regional development dynamics and thematic investment trends ultimately supportive of the policy objectives. We apply insight from nascent scholarship developing frameworks in macro-finance and geoeconomics. We then discuss our integrative theory model and discuss other literature and practitioner research insight as

analytical and diagnostic rationales for the policy prescription. We conclude in the final section with possible avenues for execution as well as future research threads to consider.

3.2 Background: The long span of history

In this section we set the stage by placing recent empirical trends in a historical context, from both global and Africa comparative perspectives, discuss relevant literature related to frameworks we have overlayed on previous analysis to develop our integrated theory model, discussed in the next section, underpinning our policy prescription and proposed solution.

3.2.1 Decomposing globalisation

Using data from the Jorda, Schularick, Taylor Macrohistory Database, a recent IMF staff note (2023) illustrates, in figure 1 below, the ebb and flow of globalisation through 5 main phases between 1870 and 2021. It measures the globalisation of production through trade openness, calculated the sum of exports and imports of every country as a proportion of global GDP.

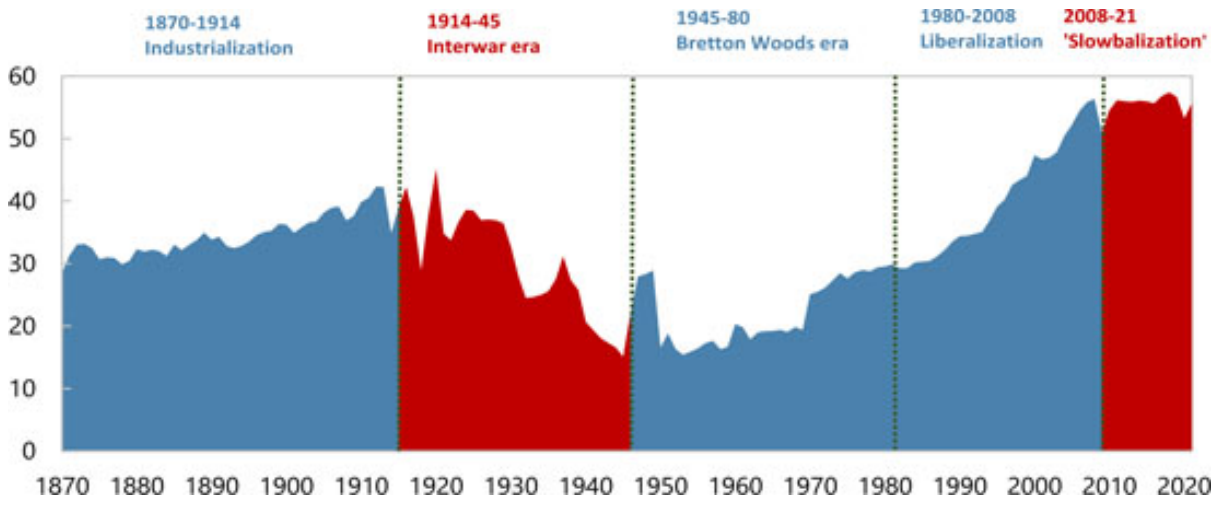


Figure 3.1: Phases of Globalisation 1870-2021, Trade Openness

Note: This table has been reproduced from Aiyar et al (2023)

The industrialisation phase saw global trade facilitated by the gold standard. The inter war period witnessed a reversal in globalisation primarily due to conflict, a subsequent rise in protectionism, regionalised trade, and the eventual the collapse of the gold standard into currency blocs. The Bretton Woods phase is defined by the legacy international institutions created then, the rise of the US as global economic and financial hegemon, with the US dollar first maintaining then ending gold convertibility ushering in wide spread adoption of flexible exchange rates. The liberalisation phase was marked at the start by the measured removal of trade barrier by large EM countries, including China, and an increasingly integrated and complex global financial system as

cross border capital flows of all types grew significantly. Though it came to an end with the Global Financial Crisis (GFC) and was followed by, at best, a plateau in the pace of globalisation, and the current phase of so-called 'slow-balisation'. In the IMF view, the liberalisation phase is largely responsible for the current shape of the world's economic structure and its multilateral institutions (including the IMF itself).

Obstfeld (2021) though (re)considers the evolution of the globalisation of finance in the half century after the post-war economic settlement, that includes Bretton Woods agreement as explained by the policy trade-offs governments faced. He articulates one of the key ingredients in the blueprint for the establishment of the IMF was Article VI recognition of scenarios justifying the use of capital flow measures, and the necessity for countries to be given some degree of monetary policy autonomy for managing the domestic economy. Otherwise, what is referred to in Obstfeld and Taylor (1998) as the open-economy monetary trilemma would dictate that with international capital mobility and fixed exchange rates countries would not have the leeway to allow domestic interest rates to diverge from US interest rate levels.

He suggests that different political dynamics applying to trade and finance had seemingly insulated financial globalisation from the recent backlash against production globalisation in the US and the other advanced, high income economies responsible for the majority of global capital market activity. But he does also highlight dissatisfaction with current practice of global financial capitalism, that has risen post-GFC and that among the primary challenges to flow from globalised finance is financial stability. He discusses the particular vulnerability of low to middle income countries (LMICs) to global financial shocks given the limited buffer from exchange rate flexibility and their more fragile financial systems. But he illustrates the high correlation between EMDE real GDP growth and the global financial cycle (GFCy) using the updated Miranda-Agrippino and Rey variable.

3.2.2 Scrambles for Africa?

As home to a global financial centre spanning the imperial and industrial ages, the UK has had an evolving role of the on the economic development of the continent while the integration of the global economy took alternate shapes. But the London Stock Exchange has cast its own particular long shadow on capital market development in Africa as well.

Looking back to the case of the Foreign and Colonial Investment Trust (FCIT) in the 19th century, as the first collective investment product of its kind, is instructive, not least because it is still in existence. We took note of the Chambers and Esteves (2014) study of this investment vehicle between 1880 -1913 as providing an early example of implications for Africa at the intersection between macro finance and geopolitics, industrialisation and investment product

innovation. The beginning of this period coincides with the Berlin Conference and the ensuing Scramble for Africa. It covers the start of the Industrial Revolution and the decline of the British Empire and the regime change in terms of global reserve currency with GBP. Rajan and Zingales (1999) argue that financial market development in many (now) advanced markets peaked at the end of this period and were at a similar level of development for the next 100 years.

The insight into the regional allocation of FCIT at 5 year intervals over a 30 year period belies the description as the world's first global EM investor. Investment was allocated to 5 geographical regions – North America, South America, Europe, Africa and Asia Pacific - and one overlapping political construct, the British Empire. In the middle of the series, between 1890 and 1895, we can observe significant change in the distribution of regional weights at market values. The allocation to underlying securities in the British Empire, having peaked at 21.8% in 1885 dropped from 18.7% in 1890 by more than half to 8.3% in 1900. The regional weight remained at that level in 1900 before falling to 7% in 1905 before more than halving again in 1910 to 3.3%.

In 1880 the largest regional allocation was to Europe, and this was a majority of funds at 51.1% but by 1910 this was only 5.5%. The second largest regional allocation at the start of the period was 18.2% but 6.1% by the end of the period. The largest regional allocation in 1890 was 32.5% to South America but had dropped to 26.8% by 1895. North America received the largest regional allocation of 44.3% in 1895, up significantly from 11.6% in 1890. In 1910 the North America had the highest regional allocation of 49.9% and South America was second at 37.7%.

The regional allocation to Africa, while included in the regional weighting assigned to the British Empire and following a similar pattern, is of distinct interest to us. Having peaked at the beginning of the period in 1880 at 8.9% it stabilised at a lower level just under 8% in 1885 and 1890. However, between 1890 and 1895 the regional allocation to Africa fell sharply from 7.8% to 1.3%. It was then stable at 1.2% in 1900 and 1905 before nearly halving to 0.7%, the lowest regional weight by some distance.

It wasn't until well into the 20th century in 1938 for the first African company to be listing on the LSE. It was a South African gold and diamond mining related firm, African Explosives and Industries. In common with FCIT it is still in existence and maintains its listing, but is now known as ACI. It was indicative of the limits of the continents integration in global markets, raising risk capital internationally was heavily focussed solely on natural resource extraction. Extractive industry focused exchanges in Canada and Australia eventually provided competition to the UK in this activity later in the century.

The pace of financial globalisation for African countries to establish a critical mass of the necessary institutions was slow and uneven. Prior to World War I only 3 countries in Africa had

securities exchanges as part of their domestic financial system. Prior to World War II only 3 countries still did - but the Casablanca Stock Exchange in Morocco had opened in 1929 while Zimbabwe's had closed in 1924. The 1953 establishment of the Nairobi Stock Exchange preceded Kenyan independence, while the Nigerian Stock Exchange was established as the Lagos Stock Exchange in the year of independence, 1960. At the same time, a nationalisation programme in Egypt resulted in a near 30-year period of dormancy for the Alexandra Exchange until reopening in and as the Cairo Stock Exchange in 1992. Fourteen of the fifteen exchanges created on the continent over the next forty years were established in the decade between 1989 and 1999.

The shadow cast by the London Stock Exchange extends another 80 years forward into the 21st century, when more than 100 African firms, with a market capitalisation of $150bn, were listed or traded in London. This led the London Stock Exchange Group (LSEG) to often repeat a self-congratulatory message about being second to the Johannesburg Stock Exchange in South Africa as the largest venue of African listings. In the last decade, Nigeria, Morocco and Kenya have all engaged in capital market development initiatives with the London Stock Exchange Group, including both market microstructure and technological development and cross listings.

In 2016 the LSEG convened an Africa Advisory Board with the intention, notwithstanding the genuine collaborative development initiatives with domestic exchanges, to position itself as the offshore regional exchange serving Africa. The LSEG AAB commissioned research output of series of simple papers, delivered in 2018, focused on 5 predetermined topic areas;

(1) Developing a market for green bonds to support infrastructure.
(2) Developing offshore local currency bond markets given the larger pool of sophisticated capital the London market offers.
(3) Improving the dissemination of corporate information to address information asymmetry
(4) Addressing the capital raising and financing challenges faced by SMES; The report described the high share of SME firms on the continent responsible for a majority of employment highlighted its ELITE programme collaboration that helps prepare firms for the process accessing public capital markets. There has been little evidence of progression to a critical mass cohort of companies listing as a result of participation.
(5) Attracting passive investment flows; Not in itself a poor suggestion, but the report focussed on doing so by country classification upgrades, something not in the purview of corporates or domestic exchanges.

Nevertheless, the AAB may be responsible for the FTSE UK Listed Africa Index is an investment product that has been designed to represent the performance of African companies listed on the London Stock Exchange. It began trading in February 2020. The rules for inclusion include eligibility criteria, with stocks eligible to be drawn from any of the six segments of the

LSEG. Eligible securities must then go through a geographic screening process, and a meet a 60 day trading screen, meaning securities that have not traded on 60 or more trading days in the past year are not eligible for inclusion. There are three geographic screens, only one of which must be met, and include incorporation in Africa, headquarters in Africa or revenues from Africa in excess of 25%.

Existing constituents of the FTSE UK Listed Africa Index may remain in the index if revenue from Africa falls below 25% but remains above 20% if the trading screen requirement has been met. As of October 2023 the FTUKLA Index had 35m constituent members and a market capitalisation of £15.6 billion. From a country representation perspective, there are 4 South African companies, 2 from Egypt, 2 from Nigeria, 1 from French West Africa, with operations in Burkina Faso, Cote d'Ivoire and Senegal and one with pan-African and Middle East operations. From an industry representation perspective the largest index weight is 33.6% in Financials, the next largest is Basic Materials with a 28.27% index weight and 18 constituents in the index. The third largest index weight is in the Energy industry with 13.37 %. The top 5 holdings account for 50.1%. of the index while the top 10 account for 79.92%. The top 10 is dominated by Financial, including 4 stocks with the weight of 33.6% and Information and Communication Technology (ICT) with a weight of 21.3%.

To some extent this mirrors the composition of the indexes in the largest markets on the continent. Having traced nearly 150 years of history we note the ebb and flow of the Africa narrative since the turn of the century has returned to a scramble[46]. Looking forward, the current scramble in Africa may well be a genuine function of a diversifying financing ecosystem and improving investment environment. However, the productivity of capital remains the link to greater economic prosperity.

3.3 Evaluating the problem

3.3.1 Applying critical and evolutionary macrofinancial frameworks

We have sought further insight from recent literature in critical macro-finance (CMF), the first proposition of the theoretical lens Gabor (2020) develops notes how US-led financial globalisation has structurally evolved around market-based-finance. It follows with the interconnected nature of global market-based finance being increasingly subject to time-critical liquidity while credit creation within this architecture can require new forms of money in the shape of systemic liabilities. The final proposition addresses institutional updating and focuses on the prerequisite, in market-based finance, of a de-risking state for systemic liabilities and new asset

[46] The Economist, Cover/Leaders/Briefing; "The Hopeless Continent", 11 May 2000 - "The Hopeful Continent", 2 March 2013 - "A New Scramble for Africa", 7 March 2019

classes. The CMF approach suggests the precise determination of that de-risking is a political outcome. A clear implication for emerging and developing economies (EMDEs) is the pressure this creates to de-risk exchange rates.

Very recent literature also includes Dafermos, Gabor, Michell (2023) exploring an evolutionary macro-finance approach to analysis that connects both macroeconomic and financial processes with institutional change. It starts with the premise that institutional change is a central feature of capitalism but notes how institutional structure is also driven by economic events. The discussion developing the analytical framework includes a criticism of the focus in economics having been on unidirectional accounts in which particular institutional formations promote growth and stability. This motivates their use of two "largely overlooked concepts in Minsky's analysis of financial capitalism" to explain cyclical historical patterns of institutional effectiveness and macrofinancial stability

The first is the presence of "customs, institutions or policy interventions" referred to as 'thwarting mechanisms', that act as a check on the instability of liberal capitalism (inherent in Minsky's view) and allow for extended periods of high economic activity and financial (and social) stability. The second is the secular cycle in macrofinancial stability generated by the rise and fall of these thwarting mechanisms. The cycle means their effectiveness varies over time, is weakened by profit seeking economic agents which then spurs the development of new thwarting mechanisms. They describe this concept as a supercycle, following the distinction drawn by Palley (2011) between basic and super cycles.

In the DGM framework a basic cycle includes all short run and medium run economic fluctuations generated by the interactions between financial and real factors capturing both business cycles and (domestic and global) financial cycles. Thwarting mechanisms reduce the amplitude of basic cycles by imposing ceilings and floors on the dynamic path of the economic system. Floor mechanisms aim to ensure a minimum level of aggregate demand while ceiling mechanisms impose upper limits on economic expansion. Ceiling mechanisms restrict both growth enhancing and instability generating activities. Notable, relevant examples of ceiling mechanisms to us include inflation targeting, financial regulation targeting procyclicality and leverage, and capital flow measures designed to restrict speculative financial inflows.

In this evolutionary framework a supercycle is a long-run institutional and political cycle over which the effectiveness of a particular configuration of thwarting mechanisms first increases and then declines, with macrofinancial stability driven by their effectiveness, in four phases; expansion, maturity, crisis and genesis. To quantitatively capture and then frame the evolution of macrofinancial stability in G7 countries, through the phases of the supercycle DGM develop a Macrofinancial Stability Index (MSI). Within a focussed discussion on the MSI results for the US

(1962 -) and the UK (1967 -) to 2019 there is acknowledgement that by dint of the index construction method it is more appropriate for single country analysis (relative change) than direct comparative analysis between countries.

Notwithstanding country specific differences described below, the MSI exhibits a similar pattern in 5 of the G7 countries DGM analysed. There are peaks in the late 1960s and late 1990s, and troughs in the early 1980s and following the crisis of 2008, followed by a period of increasing macrofinancial stability in 2012–2019. The UK exhibited a decline in stability prior to leaving the Exchange Rate Mechanism before a recovery. The 2 other G7 countries with different patterns were Germany and Japan. There is a deterioration in stability in the 1990s followed by an improvement in the 200os exhibited in Germany due to the reunification and then euro adoption. Stability in Japan declines in the 1990s as a result of the beginning of a period of stagnation.

DGM identifies two post-war supercycles: the industrial capitalism supercycle and the financial globalisation supercycle, discussing their main features and drivers, thwarting mechanisms, innovations and causes of erosion as well as the prevailing institutional architecture during each supercycle. The start of the industrial capitalism supercycle as occurs during the early 1960s in the US and UK, near the trough in global trade openness during the Bretton Woods phase of globalisation. The crisis phase occurred across the G7 between 1974 and 1979.

The financial globalisation supercycle is of significant interest to us in the context of our previous analysis of Africa. It began, with the expansion phase prior to 1986 in Japan, in 1986 in for the US and every other G7 member except for the UK, where it began in 1992. Japan entered the maturity phase far earlier than other members of the G7 in the late 1980s, with the rest at the end of the 1990s. All members were in the crisis phase between 2008 and 2013, and entered the genesis phase which continues to the end of the period, 2019. The crisis and genesis phases are of most interest to us in the context of our previous analysis leading to policy prescription and proposed solution for Africa.

3.3.2 Insights from a geoeconomics framework

We have also sought insight from very recent literature in geoeconomics. Clayton, Maggiori and Schreger (2023) develop a framework to understand the role of the practice of geoeconomics, in an era of competition between the US and China, and how it might shape global activity in the real and financial sectors. The source of geoeconomic power is a hegemon country's ability to fuse incongruent threats across multiple economic relationships to pressure a target country. But it is a softer form of indirect power operating through commercial channels as opposed to the battlefield.

Of particular interest to us are the applications they focus on after deriving a formal general model. Their model includes externalities for production and consumption as well as

limited contract enforceability. In these applications the world is composed of 3 regions, third party countries, China and a US. One application models the Belt and Road Initiative (BRI) as a sovereign lending programme with the objective of binding borrowing and trade decisions. It shows that BRI lending success cannot be analysed without reference to contract surplus China, as hegemon, can extract in one of 3 forms, a higher export price, higher loan rate or political concessions. This is an experience familiar to African countries, as a charge levelled against China in Africa since the BRI started in 2013.

In the other application models the interaction between externalities in production and national security resulting in a hegemon demanding third parties not use or import a hostile country's product. The use another example of particular salience to Africa. The US requests of Europe and other allies to desist from using the information and communication technology (ICT) infrastructure produced by the Chinese company Huawei. Africa has not forced to make the choice, perhaps in recognition that the loss of access to low cost devices that Huawei produced and sold on the continent would have too deep an economic impact.

That said, there is a very recent example of US has exerted its geoeconomic power on at least two Africa countries. The US has signalled its intention to eject Uganda and the Central African Republic from participation in the African Growth and Opportunity Act (AGOA) trade programme. AGOA was launched in 2000 to grant tariff-free export access to the US market for qualifying countries. The US says Uganda and the CAR's access would be blocked due to "gross violations of internationally recognised human rights" whereas at least Uganda says their own economic prosperity is being unfairly linked to US "cultural values."

3.4 Framing the solution: The institutional ingredients for a policy prescription

In this section we sketch some key regional dynamics that interact with institutional ingredient we describe as the foundation of our policy prescription. We discuss the broader investment environment and disaggregate the underlying regional pool of capital in the financing ecosystem, both public and private and describe supportive trends. We discuss the regional political and economic institutions and initiatives, led by the African Union Commission (AU) and exemplified by the African Continental Free Trade Agreement (AfCFTA) under AU sponsorship. We then discuss how these developments have been pursued or managed and can and should be leveraged.

3.4.1 Recent empirical trends

The 2019 BIS Committee on Global Financial System (CGFS) report on the establishment of viable capital markets presents data global trends in capital markets, evaluated the drivers of

capital market growth and supplements the analysis with surveys of market participants. There are notable instances where the comparative data for advanced economies (AEs) and emerging market economies (EMEs) would differ starkly to the underlying picture in Africa. We confirm this by retrieving that data from other sources, In table 1 which we will discuss below. There are other stylised findings of equal applicability to Africa.

The debt capital markets are where the differences in Africa to EMEs, let alone AEs are starkest. EME government bond markets are significantly bigger than African bond markets, at 35% of GDP n 2017 they were more than 3x the average in Africa between 2013-217. Most AE corporate bond markets are larger than government bond markets but most EME corporate bond markets are similar size to their government bond markets. In Africa the picture is very different with both absolutely and relatively smaller corporate bond markets than their government bond markets. Between 2013-217 corporate bond markets were around a third of the size of government bond markets.

Table 3.1 : Africa debt capital markets, financial capital flows, macro aggregates, 2013-2017

Bond Markets	
Governement Bond Market Capitalisation (% of GDP)	11.5%
Government Bond Issuance (% of GDP)	10.1%
Corporate Bond Market Capitalisation (% of GDP)	2.9%
Financial Flows	
FDI (% of GDP)	2.2%
Remittances Inflow (% of GDP)	4.4%
Cross Border Lending (% of GDP)	28.9%
Overseas Development Finance (% of GDP)	2.5%
Other Key Aggregates	
Gross Domestic Savings (current prices, LCU, % of GDP)	18.5%
Gross Fixed Capital Formation (% of GDP)	22.1%
% manufacturing investment financed by banks, equity or stock sales	15.1%
% services investment financed by banks, equity or stock sales	8.8%

Note: This table contains details of financial depth, capital flows and macroeconomic aggregates from 2003 to 2017 with annual data compiled by the author from the African Long Term Finance Scorecard data set and the African Financial Markets Initiative database

Table 3.1 above uses data from the African Long Term Finance and African Financial Markets Initiative databases to illustrate key averages between 2013 and 2017 for debt capital markets with a selection of financial flows and macroeconomic aggregates. The regional breakdown of debt capital markets highlights the heterogeneity the BIS CGFS report observes in capital markets. North Africa has the largest government bond markets on the continent, averaging 20.6% of GDP between 2013 and 2017. Southern Africa has the largest corporate bond market, but still averaging only 6.2% of GDP between 2013 and 2017. These figures only include domestic issuance in local currency and not international issuance in hard currency.

Table 3.2 below uses data from the ALTF and AFMI databases to illustrate key trends in the African equity capital markets in aggregate and broken down by region for the years between 2013 and 2020. The first panel shows the size of markets relative to GDP, a widely used measure of capacity to meet the investment demands of the real economy. The second panel shows the number of listed firms in each year, which is a measure of the supply of equity capital market assets. The bottom panel shows the assets under management (AuM) of local pension fund sector relative to GDP, a measure of a section of the local institutional investor base. Other institution investors include both Insurance companies and sovereign wealth funds.

Table 3.2 : Africa equity capital market metrics and local institutional AuM, by region 2013-2020

Stock Market Capitalisation/GDP (%), 2013 - 2020								
	2013	2014	2015	2016	2017	2018	2019	2020
Africa	63.1%	62.5%	54.7%	67.5%	87.1%	63.9%	75.9%	75.1%
SOA	215.2%	219.6%	191.2%	259.9%	287.5%	201.3%	255.7%	275.2%
WA	17.6%	14.9%	13.7%	12.8%	14.6%	10.9%	11.3%	12.9%
EA	20.1%	26.6%	21.5%	18.4%	22.2%	30.4%	19.7%	17.5%
NA	18.8%	20.3%	17.3%	15.9%	21.6%	19.4%	24.7%	21.3%

Number of listed firms, 2013 - 2020								
	2013	2014	2015	2016	2017	2018	2019	2020
Africa	1592	1666	1675	1711	1734	1758	1767	1635
SOA	541	580	579	579	575	570	590	581
WA	522	530	533	558	570	567	555	508
EA	143	154	136	164	177	207	213	150
NA	385	401	406	409	411	412	406	386

(LI) Pension Fund Assets under Management/GDP (%), 2013 - 2020								
	2013	2014	2015	2016	2017	2018	2019	2020
Africa	18.8%	16.0%	16.3%	15.3%	16.8%	17.2%	16.7%	16.8%
SSA	23.7%	19.3%	20.4%	17.5%	18.4%	19.0%	18.9%	19.9%
NA	2.3%	2.2%	2.1%	8.6%	10.5%	10.3%	9.4%	9.1%

Note: This table contains details of stock market capitalisation, the number of listed firms from 2003 to 2017 in Africa and 4 regions and local pension fund assets under management during the same period for Africa, Sub Saharan Africa and North Africa with annual data compiled by the author from the African Long Term Finance Scorecard data set and the African Financial Markets Initiative database

Trends in public equity raised in the form of IPOs and follow on offerings the continent between 2010 and 2017 is concentrated, by value at the country level, in the top 5 markets in our 11 country sample. In South Africa $8.7bn was raised in 64 IPOS and $56.2bn in 413 follow on offerings. In Egypt $2.16bn was raised in 23 IPOS and $5.49bn in 70 follow on offerings. In Nigeria $1.5bn was raised in just 7 IPOS and just over $3bn in 29 follow on offerings. In Morocco $839m was raised in 13 IPOS and more than $2.4bn in 16 follow on offerings. In Kenya $139m was raised in 6 IPOS and $944m in 413 follow on offerings. Outside the top 5 markets but of note was Mauritius, where more than $1.2bn was raised in 17 follow on offerings.

Total private capital raised for Africa across private equity, infrastructure and real assets between 2010 and 2017 exceeded $20bn. OECD estimates of impact investment AuM in 2019 was nearly $25 billion. This pool of capital includes a significant amount increasing deployed using an evolved Blended Finance approach across Africa. Blended Finance is a strategic financing approach in EFM using development finance and philanthropic funds to catalyse private capital into the scaling the operations of an existing firm. It aims to provide commercial and concessional funds at multiple stages of a firms' development across the capital structure, as well as across the value chain.

Tables 3.3 and 3.4 below use 3 different sources of practitioner data of global and African private equity fundraising and venture capital equity funding, which on inspection highlights different collection methodologies. In terms of PE fundraising, African PE was only responsible for more than 1% of fundraising once, in 2015 but was at its highest during the period in 2019. In the venture capital space, African tech start-ups in particular raised more equity in every year of the period except for 2020, and the annual growth and amount raised in 2021 were the highest on record[47]. Within that equity funding envelope around 35% of funding has gone to financial services technology (fintech) companies.

Table 3.3 : Annual PE fundraising ($bn), global and Africa, 2014-2019

Annual PE funds raised ($bn) Global, Africa 2014 - 2019							
	2014	2015	2016	2017	2018	2019	average
Global ($bn)	386.7	369.5	410.3	502.6	462.7	537.2	444.8
Africa ($bn)	1.9	4.5	3.4	2.4	2.7	3.8	3.1
Africa (%)	0.49%	1.22%	0.83%	0.48%	0.58%	0.71%	0.72%

Note: The data in this table was sourced from the African Venture Capital Association and Crunchbase

Table 3.4 : Africa tech VC total equity funding (bn$), Africa-tech specific, 2015-2021

Africa tech VC total equity funding (bn$) 2015-2021							
	2015	2016	2017	2018	2019	2020	**2021**
Africa ($bn)	0.28	0.37	0.56	1.16	2.02	1.43	**5.24**

Note: The data in this table was sourced from the Partech Ventures Africa Tech Venture Capital Report (2022)

[47] However, H1 2023 has seen a 40% drop in funding in a far more challenging environment

3.4.2 African Union as an effective convenor? AfCFTA as a milestone or a lever?

The African Union is the successor organisation to the Organisation of African Unity (OAU) which was constituted in 1963 to focus on supporting the liberation and independence movements on the continent. As the OAU it acted as forum for member states to coordinate on other areas of common concern. In 1991 it shepherded the Abuja Treaty into being, which established the African Economic Community (AEC). The AEC was as a process meant to end with an African Common Market that utilised regional economic communities (RECs) as the building blocks.

The AU was officially launched in 1999 with a vision of accelerating political and economic integration on the continent and driving development. Its objectives include the defence of member states' sovereignty, the promotion of democratic principles, peace security and stability and coordinating the harmonisation of policies between RECs. The organs of the AU that mirror the institutional structure of the European Union include the Assembly, composed of Heads of State, an Executive Council composed of Ministers designated by member states reporting to the Assembly, the Commission responsible for the operations and representing the AU, a pan African parliament and 7 Ministerial level specialised technical committees covering the issues of key sectors.
There is also an ambitious plan to create a number of pan African convening financial institutions, again like those in Europe – an African Monetary Fund, an African Central Bank and an African Investment Bank – and the creation of AEC called for a common currency. But the timelines have not been met, given the Abuja Treaty initially called for an African Central Bank by 2028 and in 2019 there was a stated plan for the single currency to be launched by 2023. Meeting the convergence criteria became even harder for countries as a result of the pandemic.

The AU has only recently gained a seat at the G20 table, similar to that of the European Union, but has achieved a more significant regional milestone with the process of operationalising AfCFTA that began January 2021. AfCFTA negotiated protocols on financial services and data to build on the foundational pillars of Digital Transformation Strategy for Africa. Those pillars are digital infrastructure, digital services, digital entrepreneurs and digital skills amid a conducive policy and regulatory environment.

General prospects for financing are highly likely to improve from the resulting liberalisation of financial services. The envisioned single market in services will facilitate the expansion of cross-border banking activity and transaction potential for a wider ecosystem. Regional supervision capacity may be tested but a coordinated emphasis on financial stability will offer benefits. For instance, the mobilisation of resources and support for increasing the domestic savings rates on the continent above the 15% of GDP average of the last two decades.

Addressing the estimated $130bn annual financing gap SMEs face will require creating a sustainable pathway to becoming growth companies and developing regional champions. In addition to the link to our proposal, it can also be linked directly to the primary objectives of AfCFTA, the execution of the intra-Africa Trade Strategy of Afreximbank and align with the policy aspirations of the African Union Digital Transformation Strategy for Africa. The last initiative has the intention to effectively create a continental digital single market by 2030. The support of digital trade and e-commerce in a well-regulated digital economy inevitably needs digital financial services and products to achieve potential economic gains[48]. This raises the question of whether this should complemented by the creation of digital currencies to accelerate the potential gains, and if do how.

The African Exchanges Linkage Project (AELP) is a joint undertaking of the African Development Bank (AfDB) and the African Association of Securities Exchanges (ASEA) The AfDB is mandated to support economic development on the continent and ASEA represents all eligible securities exchanges on the continent. The AELP is focussed on two clear objectives combined with two ambitions. The objectives are to facilitate cross border securities trading and cross border capital raising and initial public offerings (IPOs). The ambitions are in the form of hope that it will build and develop capacity between participating exchanges, while opening the door to collaboration between institutional stakeholders (regulators, central banks and central depositories). It also hopes to promote the asset class of African Listed Securities and create new products on the participating exchanges

The core aims of the AELP are addressing the lack of liquidity prevailing on African capital markets, sharing information by allowing cross border visibility, and opening access to investor to trade securities in any of the linked markets[49]. A research interview conducted with the AELP project manager in May 2020 confirmed that the last aim was the sole focus of the pilot. The purpose of the interview was to explore the technology frontier of the AELP for a more radical version of our proposal we discuss further below.

3.4.3 Regional development dynamics

In the subsection that follows we describe some key existing components and institutions relevant to the AELP in terms of regional development dynamics.

[48]The IFC-Google e-Conomy Africa 2020 report estimates the internet economy could contribute $180bn of GDP to the continental economy by 2025

[49] Phase I participating exchanges; BVRM (CIV), CSE (MAR), EGX, (EGY), JSE (ZAR), NSE (KEN), NSE (NGA), SEM (MUS), Phase II participating exchanges; BSE (BWA), GSE (GHA)

Afreximbank is a pan African multilateral trade finance institution, established by charter in 1993 under the sponsorship of the African Development Bank. Shareholder members are comprised of African governments, central banks and African and non-African financial institutions, export credit agencies and private investors and has authorised capital of USD$5bn. Afreximbank has been the underwriter of two new institutions that we consider foundational blocks in support of AfCFTA that could ultimately play a critical role in determining the scope, reach and ultimate success of AELP, the MANSA and the Pan African Payment and Settlement System (PAPSS)

MANSA is a digital data and due diligence platform designed to systemically extract cost from compliance processes, know your client (KYC) and anti-money laundering (AML) with commercial due diligence information on uniquely identified African counterparties. This will help reduce information asymmetry with consistent information on entities across the continent in standardised form. Its primary impact will be in helping SMEs access capital with more information and history to link with credit bureau information in support of effective lending decisions.

The principles of regional financial integration AfCFTA aims to specifically encourage include the free movement of labour, goods and capital alongside data, knowledge and ideas as key economic factors. It is also keen to demonstrate its recognition of the need for and thus openness to facilitating new investments in financial services technology. As such, a mandate was given in 2019 by decision from the Assembly Heads State for the AfCFTA and AUC to have Afreximbank undertake the development of PAPSS as a deliberate tool to support market integration and the implementation of AfCFTA.

The Pan African Payment and Settlement System (PAPSS) is a fully digitised cross border payment platform designed to address the costs associated with the inconvertibility of some national currencies to ensure payments can be made in those currencies Its objective is to provide the infrastructure necessary for processing, clearing and settling of payments across the continent. The overarching goal is to facilitate increasing intra-African trade by significantly reducing associated transaction costs. Key to its operational proposition is leveraging a multilateral net settlement system.

PAPSS was initially launched at the 12th Extraordinary Summit of the Assembly of the African Union, where it was adopted as a “key instrument for the implementation of the African Continental Free Trade Agreement (AfCFTA).” The initial launch was followed by the recommitment to its launch under the aegis of Afreximbank at another extraordinary AU Summit in 2020 that resulted in directing Afreximbank and the AfCFTA Secretariat to finalise work on PAPSS. An outcome of the 35th Ordinary Session of the Assembly of the AU in January 2022 was further direction to Afreximbank and the AfCFTA Secretariat to begin its continental deployment. It was

then piloted in countries withing the West African Monetary Zone (WAMZ) and its official launch and operational rollout was announced in September 2022.

Over this period PAPSS has significantly expanded its network across the region. As of 2023 it now includes 11 central banks (Djibouti, The Gambia Ghana, Guinea, Kenya, Liberia, Nigeria, Sierra Leone, Zambia and Zimbabwe), 50 commercial banks, and five so-called switches. These switches are the national interbank payment and settlement systems of five countries. They are the national e-payment switch of Rwanda (RSwitch), the national switch of The Gambia (GamSwitch), the Ghana Interbank Payment and Settlement System (GhIPSS), the Nigeria Inter-Bank Settlement System (NIBSS), and the national switch of Zimbabwe (ZimSwitch).

Among the 12 strategic partner currently maintained by PAPSS are two institutions rooted in two of the eight regional economic communities (RECs), the West African Monetary Institute and COMESA, five technology organisations focussed on payment solutions active on the continent. This includes private companies like Interswitch and eTranzact but also the cross border and payment system created by the Arab Monetary Fund, Buna. This particular strategic partnership raises the question of its wider adoption, given there are other regional interbank payment and settlement systems that compete or overlap with PAPSS, depending on perspective. It also raises questions about its scope and ambition. Critically, whether it can become an effective gateway to convertibility between continental and international currencies and provide interoperability between other payment systems and include the eventual integration of current regional systems.

The BUNA platform currently facilitates transactions in the MENA region through 4 Middle East currencies, the Euro and US Dollar as settlement currencies and the Egyptian Pound. The Sub Saharan Africa regional systems are as follows; for EAC countries the East African Payment System (EAPS), for COMESA countries the Regional Electronic Payment and Settlements System (REPSS) for Common Monetary Area countries and Zambia the SADC Integrated Regional Electronic Settlement System (SIRESS). But there are two global payment systems worth discussion as well, the US-led SWIFT and the more recently founded CIPS in China.

In the inaugural Marshall Paper, Eichengreen (2022) explores how China's efforts to build alternatives to SWIFT will be impacted by the war in Ukraine. He investigates how far China has gone in creating alternatives to SWIFT, Western banks, and the dollar and explores whether Russia and other countries might be drawn toward this parallel international financial universe. He discusses the economic and political implications this has for the United States, for its geopolitical rivals, and for global economics and politics.

On the question of the outcome of US were to barring its banks from participating in CIPS, it would be a further blow to U.S.- Chinese relations. It would accelerate the countries' economic

and financial decoupling. The decoupling is envisaged is stagnant growth bilateral trade and investment flows but not complete cessation. Limits will be placed on imports and exports of strategic goods and technologies, as we discussed earlier in an the application of the CMS framework for geoeconomics. Eichengreen concludes with the observations that the point when CIPS could blunt US or Western sanctions is still far off and there are other more pressing threats to geopolitical stability.

But the most essential strategic partners for PAPSS with respect to our policy proposal are related to stock exchanges. There is one participating exchange from Phase I of the AELP, the Nigerian Stock Exchange (NGX), but in addition PAPSS recently signed a MOU with ASEA to explore collaboration.

3.5 Discussion of Integrative Theory model

In this section we articulate and illustrate our 4-step integration of three theoretical models that inform the authors perspective on capital market development, through framing his interpretation of geoeconomic salience of the prescribed approach in a policy proposal about the importance and value of a regional (Pan African) equity ecosystem strategy.

The monetary trilemma for open economies, political economy trilemma for the world economy and a potential future paradigm we could refer to as a digital money trilemma have informed the solution. A combination of specific institutional developments create a potential window of policy opportunity, given sufficient political will. Even in the absence of progress on particular pan African institutional ambitions, the stage has been set for accelerating regional capital market integration.

In addition to frameworks, there is significant use of indexes in the literature for multiple purposes including tracing patterns over time, measuring relative evolution of single countries or ranking groups of (or all) countries and used for relative rankings.

3.5.1 The standard open economy trilemma

In previous chapters, we explored the transmission of monetary policy through the lens of this trilemma. The trade-off required of policy makers is the choice of two of the three between monetary independence (MI), exchange rate stability (ERS) and financial openness (KA). In figure 2 below we plot standardised values for real GDP, inflation (CPI), net portfolio flows and financial openness for the top 5 markets in our sample – South Africa, Nigeria Egypt, Morocco and Kenya – and we add Cote d'Ivoire. We note a sharp move upwards in real GDP in Cote d'Ivoire around 2010-2011, around and election before flattening for the rest of the period. We note financial openness

dropping off in Egypt around 2010, which coincides with the Arab Spring, but it is relatively low and stable in every other country.

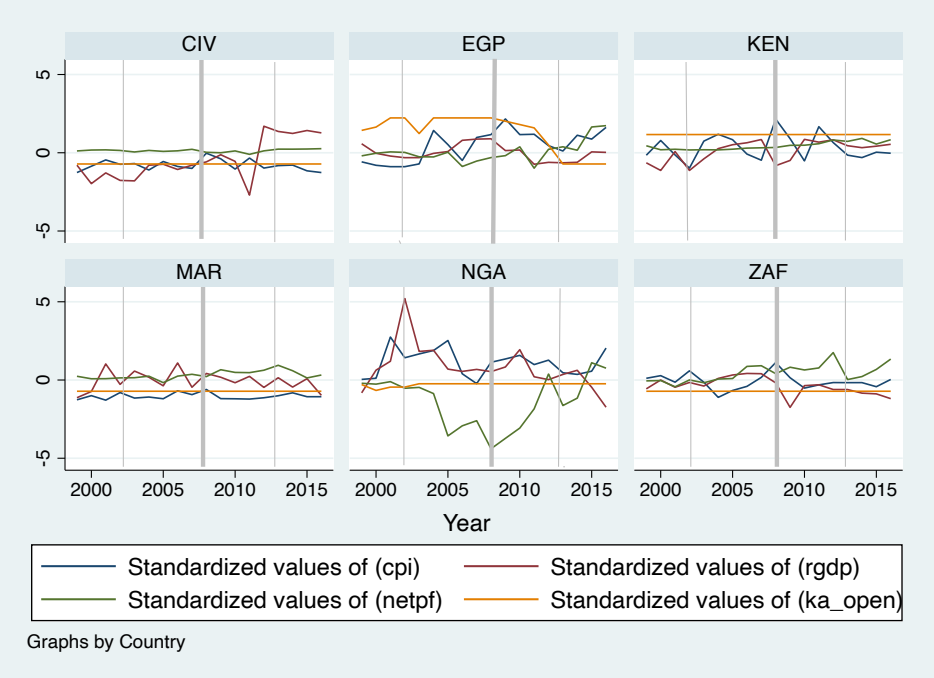


Figure 3.2: Real GDP, CPI, Net Portfolio Flows and Financial Openness 1999-2016

Note: The data in this figure was sourced from the Aizenman, Chin and Ito (2019) and the IMF IFS database

In addition to their contribution to the literature, Miranda-Agrippino and Rey (2020) consider the markedly different channels of global transmission of US and Chinese monetary policy. They confirmed US monetary policy shocks transmit across border almost regardless of the exchange rate regime of the recipient country. But they found Chinese monetary policy shocks are transmitted via contract domestic demand and prices that drags down global activity. US shocks are also propagated primarily through financial markets – with significant responses in financial conditions, risk indexes, asset prices, private liquidity and international capital flows.

Exploring the linkages between capital account liberalization, legal, institutional and financial development Chinn and Ito (2006) show that financial openness can exogenously lead to more financial development. One of their many contributions to the literature is the Chinn-Ito index (KAOPEN). It is a de jure measurement of the degree of capital account openness for panel of 108 countries. Its construction is based on 4 binary dummy variables codifying the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). The 4 binary variables indicate a. the presence of multiple exchange rates, b. restrictions on current account transactions, c. restrictions on capital account transactions, and d. a requirement to surrender export proceeds. Of interest to us with

their key finding is they initially devised to test the effect of financial liberalisation on equity market development in particular, in emerging and frontier countries.

Aizenman, Chinn and Ito (2008) summarised the trilemma configurations found between 1970-2006 for industrialised and developing countries. For industrialised countries the 3 dimensions were diverging toward high exchange rate stability and financial openness and low monetary independence (given the euro countries as a particularly apt example). But for developing countries the 3 dimensions were converging on a middle ground of managed exchange rate stability, buffered by large foreign exchange reserves but maintaining medium levels of financial openness and monetary independence.

Aizenman, Chinn and Ito (2011) constructed indexes of the 3 trilemma policy variables, to assess whether they were truly binding, by testing the simplest linear specification and observing whether the weighted sum of adds up to a constant. Observing a change in one of the trilemma variables induces a change with the opposite sign in the weighted average of the other two meant they confirmed countries do face a binding trilemma and must make trade-offs. Then as a means of answering the question of whether policy orientation matters for macroeconomic performance ACI (2011) use composite indexes. The decision of which two of the three policy goals to retain and pursue, or which one to give up can be used to describe/define a countries policy orientation.

For example, membership in currency unions (like Namibia and Cote d'Ivoire in Africa) or currency boards (Argentine pre-2001) means abandoning monetary policy independence while retaining exchange rate stability and financial openness. The Bretton Woods system let countries exercise monetary policy independence and maintain a stable value in their exchange rates stable, but also kept them financially closed. ACI used measures comprised of the principal component of two of the three indexes, to summarise policy orientation, by showing how close a country is to a vertex of the trilemma triangle.

For those comprised of MI and ERS, it measured how close to the vertex of a closed economy. Here they found that output volatility is lower the more financially closed a developing country is, but are only able to reduce output volatility when they hold ample reserves.
The composites of ERS and KAO measured how close to the vertex of a currency union or currency board. And they found that developing countries or emerging market economies with higher exchange rate stability and more financial openness or weaker monetary independence tended to have more volatile inflation. The composites of MI and KAO measured how close to vertex of a floating exchange rate. And finally here they found that the pursuit of greater monetary independence and financial openness by commodity exporters resulted in less volatile inflation

[I]

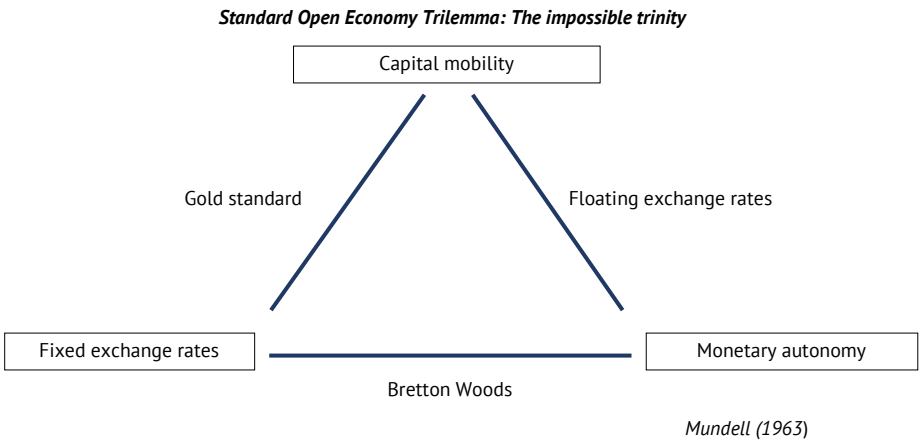


Figure 3.3: The Standard Open Economy Trilemma; " The impossible trinity"

Note: As presented in Rodrik (2020) originally in Mundell (1963)

3.5.2 The political economy trilemma

Rodrik (2011) builds on the "impossible trinity," presenting, by analogy, what he calls the political trilemma of the world economy. With the same constraints he discussed the choices faced by policy makers in various configurations. If the objective is international economic integration, policy must move towards the nation-state vertex, which would mean national politics would have to be significantly restricted, or move towards mass politics, meaning abandoning the nation-state in favour of global federalism. If policy desires highly participatory political regimes, the choice is between the nation-state and international economic integration. If keeping the nation-state is prioritised, policy must choose between mass politics and international economic integration.

Rodrik (2012) subsequently defines the perfectly integrated world economy as hyper-globalisation, "a global market that is as integrated as a national market is. Meaning a world economy where national borders are not associated with any transaction costs on international trade and finance." He also notes "the experience of…the failure of Euro zone in particular" points to considering some limits beyond regional entities. He refines the augmented political economy trilemma to the political economy trilemma for the world that positions the required trade-ffs as between hyper-globalisation, national sovereignty and democratic politics. His dire conclusion about move towards hyper-globalisation, is the sacrifice of national sovereignty or democracy, or indeed both.

Through exploring the historical and geographical evolution of the progression of the three factors, Aizenman and Ito (2020) drew the following conclusions, made the following observations and became interested in the impact on both political and financial stability. Industrialised countries started become more integrated with the world in the 1980s but had completed integrating in the 2000s, from at which point the trend in national sovereignty moderately declined. The post-2000s the decline in sovereignty and rise in globalisation converged in developing countries alongside increases in democracy. However within the developing country category Aizenman and Ito (2020) consider emerging market and non-emerging market economies characterised by policy orientations. EMEs will have pursued high levels of democracy and globalisation whereas non-EMEs will have prioritised democracy and sovereignty.

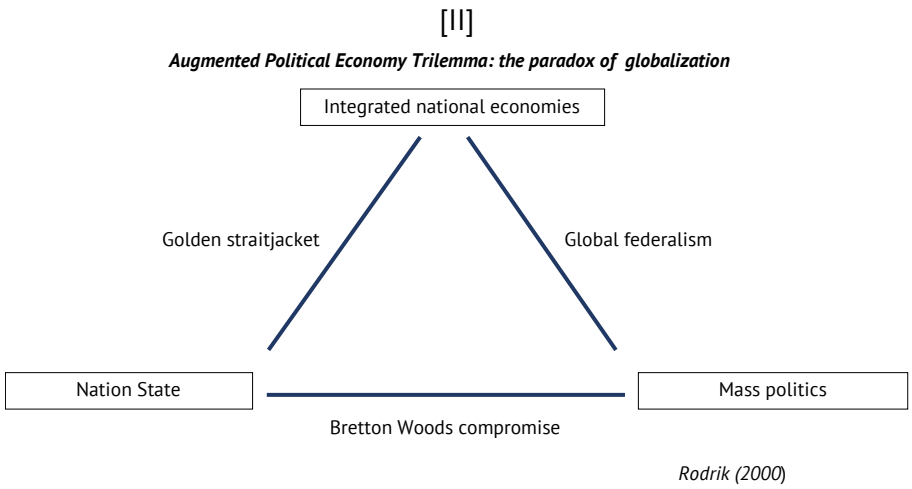


Figure 3.4: The Augmented Political Economy Trilemma; ' the paradox of globalisation
Note: As presented in Rodrik (2000)

3.5.3 A possible paradigm of future monetary arrangements

The possible paradigm of future monetary arrangements we illustrate in figure 3.5 below is representative of insights drawn from specific literature on money, liquidity and financial frictions relevant to central bank digital currencies (CBDC) other economic implications of digital currencies. Brunnermeier and Niepelt (2019) contribute a generic framework nesting multiple mostly standard models to contest certain policy objections to CBDC. With a strong commitment by an issuing central bank to act as lender of last resort with accompanying monetary policy, they demonstrate a pass through mechanism that means while bank funding levels would not change the composition of funding does. Dependent on effects adjustments are made to the consumption, production, funding and investment plans of households, firms and banks. They are then able to prove an equivalence result by establishing sufficient conditions where the swap into a CBDC doesn't change the wealth distribution or alter marginal liquidity. In that case stating equivalence follows from wealth and liquidity neutrality.

Chief among the insights Brunnermeier, James and Landau (2019) highlight about the prospects for digital money is that innovations will unbundle the three functions of money - store of value, medium exchange, unit of account. They also predict that issuers of digital currencies will re-bundle monetary functions with functions normally separate as a form of product differentiation. A notable function included is data gathering. Exploiting the competition between currencies will require convertibility and interoperability between the platforms each digital currency is native to. They also discuss the concept of digital connectedness, which habitually usurp macroeconomic links and will lead to the endogenous creation of digital currency areas (DCA), a construct introduced elsewhere in Brunnermeier and Landau (2018).

A DCA is defined as a network, where a currency specific to it is used for payments and transactions. Specific in this case means to meet one or both of two conditions. First, given DCAs are derived of a 'full currency competition' scenario the network has a its own unit account, distinct of other currencies. And second, in a typical reduced currency competition scenario, the network operates a medium of exchange with a payment instrument that can only be used inside by participants. There are key differences between a DCA and the optimal currency areas (OCA) discussed in vast quantities of the literature in the wake of Mundell (1961). Where members of an OCA are bound by geographic proximity and common shock management tools (adjustment without the use of exchange rates), members of a DCA are bound by digital connectedness.

DCAs and digital connectedness raise the prospect of "digital dollarisation" with the national currencies of both emerging and advanced economies vulnerable to displacement by the currency of a digital platform as opposed to that of another country. Brunnermeier, James and Landau (2019) make the point that small countries with high or unstable inflation are vulnerable to both traditional and digital dollarisation. They also consider the impact of competition between public and private money on traditional monetary policy channels.

Due to the potential of digital currency to reshape economic interaction, a digital economy will have a different structure, and different allocation of data ownership. The centrality of payments and data on digital platforms may lead to the paradigm of future monetary arrangements illustrated below. That economies are already migrating in the direction of "Big Tech" as systemically important intermediaries of data means a DCA with the ability to transcend borders may emerge. Digital networks therefore offer an alternative route for a currency internationalise.

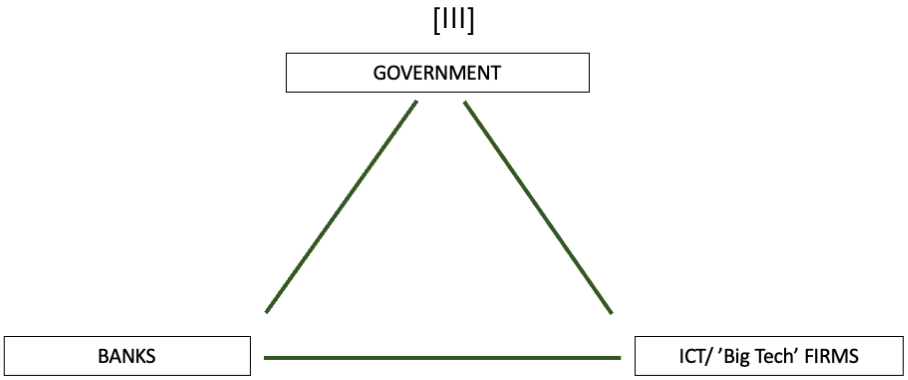


Figure 3.5: A possible paradigm of future monetary arrangements

Note: This figure is a schematic of a possible paradigm of future monetary arrangements, the sources and derivation are Brunnermeier and Niepelt (2019) and Brunnermeier, James and Landau (2019), illustrated by the author

The high adoption of and engagement with fintech in Africa offers the presence of a crucial prerequisite for the next generation of technology-enabled capital markets. It also offers contrasting approach to increased non-bank financial institution participation in market -based finance provision to the Gabor(2018) description of that transition process in China. China's shift to market-based finance, occurring between 2013 and H12017 was part of the internationalisation process for the RMB as well as a project to clean up shadow banking. The process was designed to entice foreign investors, attracted to the deep and liquid markets built by restricting residents ability to move capital abroad.

Gabor (2018) argues that an essential but neglected aspect of shadow banking in EMDEs is the financial engineering element of market-based finance. It claims there is more focus in the literature on the narrower definition of shadow banking as non-bank financial intermediation that is also a viable alternative to banking. Therein lies a critique of the narrative referenced as "shadow banking into market-based finance" as re-affirming a celebratory tone prior to the GFC of the "financial globalisation cum liberalisation thesis." The academic literature on shadow banking in low and middle income countries has placed the phenomenon linked to globalisation. Primarily because the re-engineering of shadow banking comes with pressures for EMDEs to import the institutional structures for producing liquid securities markets from the high-income countries, entangling money and bond markets However, we see different approach to aspects of transitions to market-finance in Africa.

Significant hard currency capital has been and is being raised by lending platforms that have the capability to algorithmically intermediate between banks and SMEs of various size. The resulting portfolio can then be securitised. We could refer to this as shadow banking-as-middleware. It is a growing phenomenon in Africa but likely common to a range of EMDEs with dynamic ecosystems undergirding developing but technology-enabled economies. There is an inclusive dimension is a new opportunity for capital markets that could help increase cross border investment, attracting regional and international (foreign) capital and accelerate economic growth

3.5.4 An optimised solution to a trilemma facing Africa in a multipolar world

The choice set we envision, illustrated in figure 3.6 below, is not as strictly binding the first two well established trilemmas, but the solutions we present on each side do exist between the vertices. The objective of regional economic resilience (RER) is at the top, replacing integrated national economies, or hyper-globalisation. The nation-state in the augmented political economy trilemma is replaced by national sovereignty in the refined version, which retains the same position in our configuration as national policy sovereignty (NPS). Mass politics or democracy is replaced by broad financial inclusion (BFI).

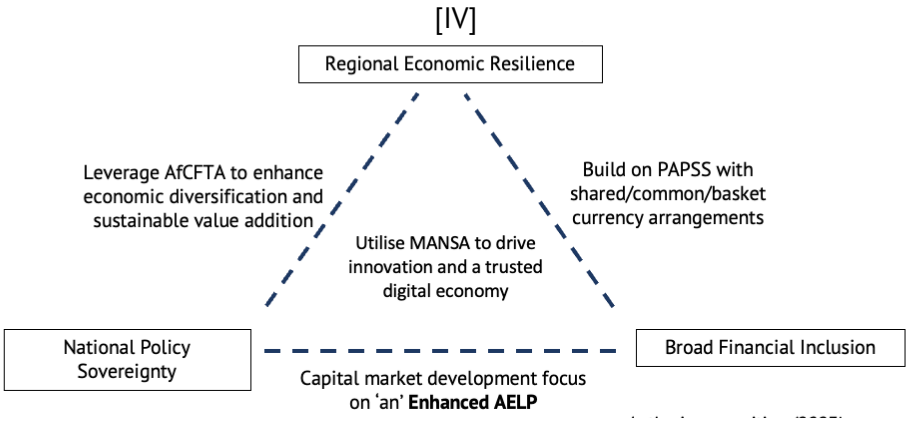


Figure 3.6: A proposed solution set to a trilemma facing Africa in a multipolar 21st century

Note: This figure is a schematic of a solution set to a trilemma facing Africa in a multipolar 21st century, proposed and illustrated by the author

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Between RER and NPS, the obvious call to action is leveraging AfCFTA is because its operationalisation implies a willingness to give up some sovereignty in favour of collective action on behalf of its signatories. Between NPS and BFI, lies the risk to policy makers and leaders of policy failures leading to an opposite outcome, broader inequality. This leg therefore has a significant binding constraint as a trade-off policy makers would not relish, but it is opposite the call to action about building on PAPSS. Between RER – BFI, the prospect of building on PAPSS

towards a shared currency arrangement is a challenge despite the benefits of the notable link between exchange rates, trade and growth. Unlike the network of pan African banking groups who are well place and able if not always willing to facilitate x-border trade, our model suggest to un that a pan African asset /investment management leadership and capability is what missing is from the local financing ecosystem architecture. But there are numerous rationales for policy development towards a shared currency or basket arrangement - the benefits of a lower inflation bias, increased credibility from monetary integration, but also the encouragement of trade that may synchronise domestic business cycles. However, realistically a more optimised currency platform for the equity capital markets on the continent, if not an optimal currency area (OCA)

We place the utilisation MANSA in the middle of the triangle as its role in the continued development of credit information supports expansion of access to capital and ideally public capital markets in due course, to a wider range of SMEs. But also because it is not at odds with the RER to NPS link or the RER to BFI link, BFI can be facilitated by fintechs as well as through access to wider range of investment opportunities on the continent. AfCFTA protocol on financial services should be a significant tool for facilitating regional integration, assuming a willingness to pool rather than forgo policy sovereignty.

Thus, a transformation of part of the economic development focus is necessary, and an Enhanced AELP imitative as anchor will justifies that change. We believe the integration of the capital markets of AELP members, will eventually make the financial integration across the continent more symmetric., But an Enhanced AELP still requires significant political will. There is a more radical version that includes a de novo decentralised institution built with digital infrastructure and issues tokenised securities but it is not plausible at scale for a host of reasons. The liquidity benefits of the AELP are likely to flow to the largest companies with existing listings, but this still aids development.

3.6 Recommendations and Future Research

A pan-African stock exchange could be justified, first and foremost, by size. This is both despite and because of the caveat of using market size relative to GDP as a gauge. The fact it reflects changes in value is important due to the link to exchange rates – domestic equity capital markets may be small for different reasons but the benefits of larger markets are undeniable. The supply side of public equity markets needs to be addressed. More listed companies also increases the pool of potential participants in the corporate bond market, where Africa underperforms, and a broader range of securities listed across asset classes will allow for more complete markets.

Below, we discuss the feasibility of three recommendations we would to make policy makers for said enhancement, They supplement the three calls to action referenced in the model schematic.

- Increased commitment to accelerated creation of key Pan-African institutions – African Central Bank, African Monetary Fund - that would strengthen the efficacy of existing policy ingredients like PAPSS that address the need for foreign exchange convergence on the continent

This is by the hardest to influence let alone implement. Significant time has passed since the first commitments we made and milestones have already been missed. Perhaps the success in operationalising AfCFTA can be harnessed as a catalyst for change in institutional development.

We therefore suggest a sub-regional focus in West Africa due to locus of critical ingredients for development. The PAPSS rollout has been focussed in the region, the prospect of NGX increased engagement has benefits for Nigerian and the Nigerian capital markets, which mirrors certain characteristics of African capital markets in aggregate. There is also tactical opportunity from geopolitical shift driving changes to CFA arrangement, and potential change of name (to the ECO) and change of monetary arrangement could entail a change in membership. PAPSS has the capability to facilitate a transition that is integrated into a capital market development strategy.

- More ambitious technology adoption – while there is already significant dispersion of technology from major global exchanges competitors (LSE, NASDAQ) to stock exchanges in Africa, the recent move to T+1 settlement in DM risks a widening gap as this will potentially add another layer of relative friction costs

Beyond cost and speed of implementation as limiting factors, the pace of global developments demands efforts to close the gap, given the lag, but should be the easiest to work through. course this could include the adoption of AI.

- Deliberate ecosystem development - encouraging consolidating M&A of start-up ventures currently supported by increased private capital deployment to create a pipeline of future listings are only constrained by execution time.

It also includes deliberate support a range of sectors and securitisation potential – on the one hand we consider opportunities equitization does not require the assets to be stocks, there are tradeable assets that could be transformed from SME liabilities. On the other, where a programme like MOBILIST has a sustainability focus (eg clean energy transition businesses and projects) a

range of technology-enabled business, growing digital commerce opportunities are constrained in finding diverse sources of capital, but are still attracting private capital in need of eventual exit.

Equally, there is an opportunity for deliberate targeting of risk capital provision to sectors that will make the continent more resilient in light of recent experience, specifically healthcare and research and development in biotech and life sciences. And adequate consideration must be given to communicating the benefits. In contrast to the a focus on addressing information asymmetry as per the related LSEG AAB recommendation, we suggest engaging on a Pan-African wealth and investment opportunity narrative. The ultimate goal of these elements is attracting and compelling regional pools (local PFs) and coopting other pools of capital (beyond US, EU institutional and China SOE allocators) to support companies - national champions and those with Pan-African strategies and business models - to use key African exchanges

Finally, future research ideas that flow from the contribution of our integrated theory model could be the work of creating of a set of indexes for the policy objectives in order to quantitatively test their binding constraints.

Chapter IV: Conclusions and Future Research

4.1 Summary of core findings, discussion of limitations and thesis conclusion

In this section, we summarise our core findings, highlight some limitations of the methodologies chosen and discuss our contribution as a means of sketching a future research agenda in the final section.

Over the preceding three chapters we utilised the impossible trinity, open economy trilemma advanced by Mundell and Fleming (1960) and the globalisation paradox, political economy trilemma advanced by Rodrik (2000) for our analytical framing. We investigated the extent of temporal variation in risk asset price (equities) sensitivity to the global financial cycle (GFCy) and international risk taking channel of transmission of monetary policy as demonstrated by Rey (2015, 2016). Our empirical analysis with standard econometric tools was heavily influenced by the methodological approach to relationships between key centre economies and the periphery from Aizenman, Chinn and Ito (2010, 2016).

Utilising a common financial and economic time series dataset for a selected sample of 11 (out of 25 continental securities exchanges) emerging and frontier capital markets in Africa, we sought to ascertain the importance of size, liquidity, economic composition, and institutional settings (that include monetary, regional economic, trade and customs agreement areas) and develop a model to estimate the influence of the GFCy.

In the first chapter, we found through a combination of structural (push and pull) factors and consideration of key events that asymmetric integration and risk perceptions explain differences in African equity market resilience. We confirm institutions and policy choices do matter. Specifically, the exchange rate channel matters for financial flows, and liquidity matters more broadly for market resilience. Capital market size is important and economic size is more likely to interact with economic composition.

Some limitations of our methodology included our self-imposed constraint of finding variables available at monthly frequency. This meant some institutional condition data compiled and analysed was not integrated into the model. Our analysis did not include the idiosyncrasies of single stock behaviour and the equal weighting of the panel risked overinterpretation of results. However, we were still able to generate insights to build on with different tools

In the second chapter, we found that the interaction of economic complexity and index concentration is material, regional dynamics have significant importance (with some confounding, some expected results) and the source of external shocks matters. We were able to confirm history matters in the context of policy. Both over the long run through embedded legacies and in the short to medium run we can see evidence in certain event windows. Regional and institutional stances make geography important, as evidenced by the responses of LSI within each of the 4 constructed geoeconomic zones to economic growth shocks in some contexts. The size of markets remains a dominant driver but that certain structural elements of the financing ecosystem has explanatory value

For limitations of methodologies adopted in the second chapter, we highlight two elements. First, a difference in difference estimator could have enhanced the quasi-natural experiments, over the relative difference comparisons we deployed, with more precise quantification. Second, our approach to predicting IRFs that met the stability condition did not use Cholesky ordering of variables and may have benefited from a formal matrix set up. However, we

We retained the trilemmatic aspect of the analytical framework that guided the preceding chapters, in the third chapter but made use of a white paper structure, given its applied contribution. Developing answers our research questions took the form of a differential diagnosis of the problem builds on and synthesis insights in preceding chapters. We frame a macro-financial and geopolitical trilemma where Africa is in a global competition for risk capital, in a multipolar world. Achieving the policy goal of regional economic resilience might require a trade-off between the aims of maintaining national policy sovereignty or increasing broad financial inclusion.

To propose a solution, we introduce an integrated theory model we believe is beneficial to policy makers and practitioners for the understanding of the importance of economic resilience and benefits of market resilience for Africa. The anchoring recommendation for achieving the key policy objective is an intentional focus on capital market innovation as part of the broader development agenda to ride the wave of an existing initiative.

Regional economic resilience has increased in importance to Africa since our research began. With the prospect of a new Cold War shaping the agenda of the next century, the mercantilist trade tensions and techno-nationalism that has defining the relationship between the 3 largest economies has made the last decade the eventful. With the ending of a secular low rate, low inflation regime after a series of economic shocks, the second order effects of the transition to a high rate, high inflation regime creates disproportionate challenges for African economies.

Among them, the potential for geopolitical tensions to lead to fragmentation. Geoeconomic alignments in terms of cross border flows (hot vs sticky money) create both opportunities and risks. It highlights the dilemmas consistently faced by EMDEs in the past on hot v sticky money and the

use of capital flow measures. A compelling rationale for a shared capital market solves for size and liquidity shortfalls that expose pockets of capital markets on continent to asymmetric risks.

Notwithstanding our concentration on equities as risk asset prices throughout, we have done sow with an acknowledgement of the context dependency of definitions for risk assets. Where theory clearly differentiates between general equity risk and credit risk, the perspectives of different market participants' will always matter – for international institutional investors, global risky assets generally includes equities and corporate bonds, while in emerging and frontier markets investible risk assets might also include currencies, where possible and if permitted, whereas for local institutional investors, different regulatory constraints may exist in addition to local funding considerations.

Efforts to harmonise these frictions within AfCFTA and beyond could make the convening power of a pan African venue capable of pooling assets and attracting issuers should be a compelling dynamic in the global competition for need risk capital, in all its forms. By that we mean as an instrument of financial and economic statecraft. But notably, we have also concluded the proposed solution set also implicitly highlights a corporate development opportunity in the pan African asset and investment management industry. The continent has a number of significant Pan African banking institutions but lacks investment managers with similar breadth of coverage.

4.2 Future Research

As mentioned above, there is a particular aspect of our policy recommendations that lends itself to industry research and diligence agenda while also generating proprietary data. We also see scope to further develop an idea referenced in the previous chapter - shadow banking as middleware, and as alternative to the challenges of listing internationally. But for future analytical research we should give consideration of alternate geoeconomic configurations and other key countries with respect to Africa - While South Africa has been included in our analysis it has been as within Africa, its dominance notwithstanding, China has been one the key external economies whose impact on financial markets has been analysed. However, the impact of other remaining members of the BRICS grouping of countries - India, Russia and Brazil - may be worthy of deeper individual focus in further research given the broader geoeconomic developments currently unfolding.

In addition to a broader set of external economies included in the empirical analysis, part of a future research agenda should also involve updating and widening the dataset as there more and better data available to parse with our existing insights. Using one example the changing trade balance between India and Sub Saharan Africa between 2000 and 2021 was prefaced and

mirrored by Refined Crude being replaced as the top import by Information and Communications Technology (ICT) in a number of key African countries between 2003 and 2017.

Finally, there is significant merit in considering the role of AI in the globalisation of services interacting with a capital market growth strategy, not least given the high technology adoption dynamics that have driven and are economic growth in parts of the continent.

Bibliography

Abiad, A., Bluedorn, J., Guajardo, J. and Topalova, P. (2015). The rising resilience of emerging market and developing economies. *World Development*, **72**: 1-26.

Abrigo, M.R. and Love, I. (2016). Estimation of panel vector autoregression in Stata. *The Stata Journal*, **16**(3): 778-804.

Acemoglu, D. (2005). Politics and economics in weak and strong states. *Journal of Monetary Economics*, **52**(7): 1199-1226.

Acemoglu, D. and Guerrieri, V. (2008). Capital deepening and non-balanced economic growth. *Journal of Political Economy*, **116**(3): 467-498.

Acemoglu, D. and Johnson, S. (2005). Unbundling institutions. *Journal of Political Economy*, **113**(5): 949-995.

Ahmed, S., Coulibaly, B. and Zlate, A. (2017). International financial spillovers to emerging market economies: How important are economic fundamentals? *Journal of International Money and Finance*, **76**: 133-152.

Aiyar, M.S., Chen, M.J., Ebeke, C., Ebeke, M.C.H., Garcia-Saltos, M.R., Gudmundsson, T., Ilyina, M.A., Kangur, M.A., Kunaratskul, T., Rodriguez, M.S.L. and Rodriguez, S. (2023). *Geo-economic fragmentation and the future of multilateralism*. International Monetary Fund.

Aizenman, J., Chinn, M.D. and Ito, H. (2008). *Assessing the emerging global financial architecture: Measuring the trilemma's configurations over time* (No. w14533). National Bureau of Economic Research.

Aizenman, J., Chinn, M.D. and Ito, H. (2010). The emerging global financial architecture: Tracing and evaluating new patterns of the trilemma configuration. *Journal of International Money and Finance*, **29**(4): 615-641.

Aizenman, J., Chinn, M.D. and Ito, H. (2016). Monetary policy spillovers and the trilemma in the new normal: Periphery country sensitivity to core country conditions. *Journal of International Money and Finance*, **68**: 298-330.

Aizenman, J. and Ito, H. (2012). Trilemma policy convergence patterns and output volatility. *The North American Journal of Economics and Finance*, **23**(3): pp.269-285.

Aizenman, J. and Ito, H. (2020). The political-economy trilemma. *Open Economies Review*, **31**(5): 945-975.

Akıncı, Ö. (2013). Global financial conditions, country spreads and macroeconomic fluctuations in emerging countries. *Journal of International Economics*, **91**(2): 358-371.

Allison, G. (2017). The Thucydides trap. *Foreign Policy*, **9**(6): 73-80.

Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, **58**(2): 277-297.

Assane, D. and Malamud, B. (2010). Financial development and growth in sub-Saharan Africa: do legal origin and CFA membership matter? *Applied Economics*, **42**(21): 2683-2697.

Asongu, S., Nwachukwu, J. and Tchamyou, V. (2017). A literature survey on proposed African monetary unions. *Journal of Economic Surveys*, **31**(3): 878-902.

Asongu, S. (2014). How would monetary policy matter in the proposed African monetary unions? Evidence from output and prices. *African Finance Journal*, **16**(2): 34-63.

Baker, S.R., Bloom, N. and Davis, S.J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, **131**(4): 593-1636.

Beber, A. and Brandt, M.W. (2006). The effect of macroeconomic news on beliefs and preferences: Evidence from the options market. *Journal of Monetary Economics*, **53**(8): 1997-2039.

Beck, T., Levine, R. and Loayza, N. (2000). Finance and the Sources of Growth. *Journal of Financial Economics*, **58**(1-2): 261-300.

Bekaert, G., Harvey, C.R. and Lundblad, C. (2001). Emerging equity markets and economic development. *Journal of Development Economics*, **66**(2): 465-504.

Bekaert, G., Harvey, C.R., Kiguel, A. and Wang, X. (2016). Globalization and asset returns. *Annual Review of Financial Economics*, **8**: 221-288.

Berger, D., Pukthuanthong, K. and Yang, J.J. (2011). International diversification with frontier markets. *Journal of Financial Economics*, **101**(1): 227-242.

Bernanke, B. and Gertler, M. (1999). Monetary policy and asset price volatility. *Economic Review*, **84**(Q IV): 17-51.

Blanchard, O., Das, M. and Faruqee, H. (2010). The Initial Impact of the Crisis on Emerging Market Countries. *Brookings Papers on Economic Activity*, **41**(1): 263-323.

Borio, C. and Zhu, H. (2012). Capital regulation, risk-taking and monetary policy: a missing link in the transmission mechanism?. *Journal of Financial Stability*, **8**(4): 236-251.

Boyarchenko, N. and Elias, L. (2024). *The Global Credit Cycle* (No. 1094). Federal Reserve Bank of New York.

Braun, B., Gabor, D. and Hübner, M. (2018). Governing through financial markets: Towards a critical political economy of Capital Markets Union. *Competition & Change*, **22**(2): 101-116.

Brunnermeier, M.K., James, H. and Landau, J.P. (2019). *The digitalization of money* (No. w26300). National Bureau of Economic Research.

Brunnermeier, M.K. and Niepelt, D. (2019). On the equivalence of private and public money. *Journal of Monetary Economics*, **106**: 27-41.

Bruno, V. and Shin, H.S. (2015). Capital flows and the risk-taking channel of monetary policy. *Journal of Monetary Economics*, **71**: 119-132.

Burger, J.D. and Warnock, F.E. (2007). Foreign participation in local currency bond markets. *Review of Financial Economics*, **16**(3): 291-304.

Calderón, C. and Kubota, M. (2013). Sudden stops: Are global and local investors alike?. *Journal of International Economics*, **89**(1): 122-142.

Calderón, C. and Boreux, S. (2016). Citius, Altius, Fortius: Is Growth in Sub-Saharan Africa More Resilient?. *Journal of African Economies*, **25**(4): 502-528.

Calvo, G.A., Leiderman, L. and Reinhart, C.M. (1996). Inflows of Capital to Developing Countries in the 1990s. *Journal of Economic Perspectives*, **10**(2): 123-139.

Cerutti, E., Claessens, S. and Rose, A.K. (2019). How important is the global financial cycle? Evidence from capital flows. *IMF Economic Review*, **67**(1): 24-60.

Chambers, D. and Esteves, R. (2014). The first global emerging markets investor: Foreign & Colonial Investment Trust 1880–1913. *Explorations in Economic History*, **52**: 1-21.

Charteris, A.H. and Strydom, B. (2016). Capital market openness and volatility: an investigation of five Sub-Saharan treasury bill rates. *International Journal of Emerging Markets*, **11**(3): 438-459.

Chena, A.H. and Siemsb, T.F. (2004). The effects of terrorism on global capital markets. *European Journal of Political Economy*, **20**: 349-366.

Chikis, C.A. (2023). The Developmental Trinity: Institutions, Infrastructure, and Technology. World Bank

Chinn, M.D. and Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics*, **81**(1): 163-192.

Chinn, M. and Ito, H. (2008). A New Measure of Financial Openness. *Journal of Comparative Policy Analysis*, **10**(3): 309-322.

Christensen, B.V. (2011). Have monetary transmission mechanisms in Africa changed? *BIS Papers chapters*, **56**: 37-61.
Christensen, B.V. (2011). *Have monetary transmission mechanisms in Africa changed?* (Vol. 56: 37-61). Bank for International Settlements.

Chu, T.H., Stocker, M.L. and Tan, B.J. (2021). Economic fitness: How equity market returns reflect the realization of economic growth potential. *International Journal of Finance & Economics*, **26**(1): 1550-1562.

Clark, W.R., Hallerberg, M., Keil, M. and Willett, T.D. (2012). Measures of financial openness and interdependence. *Journal of Financial Economic Policy*, **4**(1): 58-75.

Clayton, C., Maggiori, M. and Schreger, J. (2023). *A framework for geoeconomics* (No. w31852). National Bureau of Economic Research.

Corrales, J.S., Imam, P.A., Weber, S. and Yehoue, E. (2016). Dollarisation in sub-Saharan Africa. *Journal of African Economies*, **25**(1): 28-54.

Dafermos, Y., Gabor, D. and Michell, J. (2023). Institutional supercycles: an evolutionary macro-finance approach. *New Political Economy*, **28**(5): 693-712.

Debrun, X., Masson, P.R. and Pattillo, C. (2011). Should African monetary unions be expanded? An empirical investigation of the scope for monetary integration in Sub-Saharan Africa. *Journal of African Economies*, **20**(suppl_2): ii104-ii150.

de Jong, F. and de Roon, F.A. (2005). Time-varying market integration and expected returns in emerging markets. *Journal of Financial Economics*, **3**(78): 583-613.

Didier, T., Hevia, C. and Schmukler, S.L. (2012). How resilient and countercyclical were emerging economies during the global financial crisis?. *Journal of International Money and Finance*, **31**(8): 2052-2077.

Diebold, F.X. and Yilmaz, K., 2009. Measuring financial asset return and volatility spillovers, with application to global equity markets. *The Economic Journal*, **119(**534): 158-171.

Donou-Adonsou, F. (2019). Colonialism ties and stock markets: Evidence from Sub-Saharan Africa. *Research in International Business and Finance*, **47**: 327-343.

Eichengreen, B. (2022). *Sanctions, SWIFT, and China's cross-border interbank payments system*. Center for Strategic and International Studies (CSIS).

Eichengreen, B.J., Borensztein, E. and Panizza, U. (2006). *A tale of two markets: Bond market development in East Asia and Latin America*. Hong Kong Institute for Monetary Research.

Eichengreen, B. and Flandreau, M. (2009). The rise and fall of the dollar (or when did the dollar replace sterling as the leading reserve currency?). *European Review of Economic History*, **13**(3): 377-411.

Eichengreen, B. and Luengnaruemitchai, P. (2006). *Bond Markets as Conduits for Capital Flows: How Does Asia Compare?* (No. 12408). National Bureau of Economic Research.

Enowbi-Batuo, M. and Kupukile, M. (2010). How can economic and political liberalisation improve financial development in African countries? *Journal of Financial Economic Policy*, **2**(1): 35-59.

Emmanuel, O.N.B., Thierry, M.A. and Christian, A.Z.C. (2024). What drives financial market growth in Africa? *International Review of Financial Analysis*, **91**: 102990.

Farhi, E. and Maggiori, M. (2018). A model of the international monetary system. *The Quarterly Journal of Economics*, **133**(1): 295-355.

Farhi, E. and Werning, I. (2014). Dilemma not trilemma? Capital controls and exchange rates with volatile capital flows. *IMF Economic Review*, **62**(4): 569-605.

Francis, B.B., Hasan, I. and Ofori, E. (2015). Investor Protections, Capital Markets, and Economic Growth: The African Experience. *Advances in Financial Economics*, **18**: 239-272.

Friedman, M. (1961). The lag in effect of monetary policy. *Journal of Political Economy*, **69**(5): 447-466.

Forbes, K.J. and Rigobon, R., (2002). No contagion, only Interdependence: Measuring stock market co-movements. *Journal of Finance*, **57**(5): 2223-2261.

Fowowe, B. and Shuaibu, M. (2016). Dynamic spillovers between Nigerian, South African and international equity markets. *International Economics*, **100**(148): 59-80.

Gabaix, X. and Koijen, R.S. (2020). *Granular Instrumental Variables* (No. w28204). National Bureau of Economic Research.

Gabor, D., (2020). Critical macro-finance: A theoretical lens. *Finance and Society*, **6(**1): 45-55.

Gabor, D., (2018). Goodbye (Chinese) Shadow Banking, Hello Market-based Finance. *Development & Change*, **49(**2): 394-419.

Georgiadis, G. and Jancoková, M. (2016). *Financial Globalisation, Monetary Policy Spillovers and Macro-Modelling: Tales from One Hundred and One Shocks*. Mimeo. European Central Bank.

Gourinchas, P.O. and Obstfeld, M. (2012). Stories of the twentieth century for the twenty-first. *American Economic Journal: Macroeconomics*, **4**(1): 226-265.

Gourinchas, P.O. and Rey, H. (2007). International Financial Adjustment. *Journal of Political Economy*, **115**(4): 665-703.

Gräbner, C., Heimberger, P., Kapeller, J. and Springholz, F. (2021). Understanding economic openness: a review of existing measures. *Review of World Economics*, **157**: 87-120.

Hardie, I., Howarth, D., Maxfield, S. and Verdun, A. (2013). Banks and the False Dichotomy in the Comparative Political Economy of Finance. *World Politics*, **65**(4): 691-728.

Haile, F.(2017). Global shocks and their impact on the Tanzanian economy. *Economics*, **11**(9): 1-38

Hannan, S.A. (2017). *The Drivers of Capital Flows in Emerging Markets Post Global Financial Crisis*. International Monetary Fund.

Harris, L. (2012). From financial development to economic growth and vice versa: a review of international experience and policy lessons for Africa. *Journal of African Economies*, **21**(suppl_1): i89-i106.

Hausmann, R. and Hidalgo, C.A. (2011). The network structure of economic output. *Journal of Economic Growth*, **16**(4): 309-342.

Husain, A.M., Mody, A. and Rogoff, K.S. (2005). Exchange rate regime durability and performance in developing versus advanced economies. *Journal of Monetary Economics*, **1**(52): 35-64.

Ilzetzki, E., Reinhart, C.M. and Rogoff, K.S. (2017). *The Country Chronologies to Exchange Rate Arrangements into the 21st Century: will the anchor currency hold?* (No. w23135). National Bureau of Economic Research.

Ilzetzki, E., Reinhart, C.M. and Rogoff, K.S. (2019). Exchange arrangements entering the twenty-first century: Which anchor will hold? *The Quarterly Journal of Economics*, **134**(2): 599-646.

Jerven, M. and Johnston, D. (2015). Statistical tragedy in Africa? Evaluating the data base for African economic development. *The Journal of Development Studies*, **51**(2): 111-115.

Jordà, Ò., Schularick, M., Taylor, A.M. and Ward, F. (2019). Global financial cycles and risk premiums. *IMF Economic Review*, **67**(1): 109-150.

Klein, M.W. (2012). *Capital controls: Gates versus walls* (No. w18526). National Bureau of Economic Research.

Koepke, R. (2019). What drives capital flows to emerging markets? A survey of the empirical literature. *Journal of Economic Surveys*, **33**(2): 516-540.

Kondratieff, N.D. and Stolper, W.F. (1935). The Long Waves in Economic Life. *The Review of Economics and Statistics*, **17**(6): 105-115.

Konuki, M.T. and Villafuerte, M.M. (2016). *Cyclical Behaviour of Fiscal Policy among Sub-Saharan African Countries*. International Monetary Fund.

Krugman, P. (1991). Increasing Returns and Economic Geography. *The Journal of Political Economy*, **99**(3): 483-499.

Labuschagne, C., Majewska, E. and Olbryś, J. (2016). Crisis periods, contagion and integration effects in the major African equity markets during the 2007-2009 global financial crisis. *Optimum. Economic Studies*, **5**(83): 31-52.

Lane, P.R. (2016). International financial flows and macro-financial risk in SSA. *Journal of African Economies*, **25**(4): 580-613.

Lane, P.R. and Milesi-Ferretti, G.M. (2007). The external wealth of nations mark II: Revised and extended estimates of foreign assets and liabilities, 1970-2004. *Journal of International Economics*, **73**(2): 223-250.

Lane, P. and Milesi-Ferretti, G.M. (2017). *International Financial Integration in the Aftermath of the Global Financial Crisis* (No. 2017/115). International Monetary Fund.

La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2008). The Economic Consequences of Legal Origins. *Journal of Economic Literature*, **46**(2): 285-332.

Lo, G.D., Marcelin, I. and Bassene, T. (2023). Global Uncertainty, Connectedness and Risk Spillovers Among Sub-Saharan Africa and MENA Equity Markets. *Connectedness and Risk Spillovers Among Sub-Saharan Africa and MENA Equity Markets*.

Levy-Yeyati, E. and Sturzenegger, F. (2005). Classifying exchange rate regimes: Deeds vs. words. *European Economic Review*, **49**(6): 1603-1635.

Levy-Yeyati, E. and Williams, T. (2012). Emerging economies in the 2000s: Real decoupling and financial recoupling. *Journal of International Money and Finance*, **31**(8): 2102-2126.

Luttwak, E.N. (1990). From geopolitics to geo-economics: Logic of conflict, grammar of commerce. *The National Interest*, **20**: 17-23.

MacKinlay, A.C. (1997). Event Studies in Economics and Finance. *Journal of Economic Literature*, **35**(1): 13-39.

Maggiori, M., Neiman, B. and Schreger, J. (2020). International currencies and capital allocation. *Journal of Political Economy*, **128**(6): 2019-2066.

McMillan, D. and Thupayagale, P. (2011). Measuring volatility persistence and long memory in the presence of structural breaks: Evidence from African stock markets. *Managerial Finance*, **37**(3): 219-241.

Mishkin, F.S. (2001). The Transmission Mechanism and the Role of Asset Prices in Monetary Policy. *NBER Working Papers*, (8617).

Mishkin, F.S. and Schmidt-Hebbel, K. (2007). Does Inflation Targeting Make a Difference? *NBER Working Paper*s, (w12876).

Mishra, P., Moriyama, K., N'Diaye, P. and Nguyen, L. (2014). *Impact of Fed Tapering Announcements on Emerging Markets* (No. 2014/109). International Monetary Fund.

Miranda-Agrippino, S., Nenova, T. and Rey, H. (2020). *Global Footprints of Monetary Policy* (No. 2004). Centre for Macroeconomics (CFM).

Miranda-Agrippino, S. and Rey, H. (2015). *World asset markets and the global financial cycle* (Vol. 21722: 1-68). National Bureau of Economic Research.

Mu, Y., Stotsky, J.G. and Phelps, P. (2013). Bond markets in Africa. *Review of Development Finance*, **3**(3): 121-135.

Mukherjee, R. (2015). Institutions, corporate governance and capital flows. *Journal of International Economics*, **96**(2): 338-359.

Mundell, R.A. (1961). A Theory of Optimum Currency Areas. *The American Economic Review*, **51**(4): 657-665.

Mundell, R.A. (1963). Capital Mobility and Stabilization Policy Under Fixed and Flexible Exchange Rates. *Canadian Journal of Economics and Political Science*, **29**(4): 475-485.

Ncube, M. (2007). Financial services and economic development in Africa. *Journal of African Economies*, **16**(suppl_1): 13-57.

Nölke, A. (2022). Geoeconomic infrastructures: Building Chinese-Russian alternatives to SWIFT. In *Capital Claims: Power and Global Finance* (pp. 147-166). Routledge.

Nordin, S. and Nordin, N. (2016). The impact of capital market on economic growth: a Malaysian outlook. *International Journal of Economics and Financial Issues*, **6**(7): 259-265.

Obstfeld, M. (2021). The global capital market reconsidered. *Oxford Review of Economic Policy*, **37**(4): 690-706.

Obstfeld, M., Ostry, J. and Qureshi, M. (2017). *A Tie That Binds: Revisiting the Trilemma in Emerging Market Economies* (No. 2017/130). International Monetary Fund.

Obstfeld, M. and Taylor, A.M. (2004). *Global Capital Markets: Integration, Crisis, and Growth*. Cambridge University Press.

O'Connell, S.A. (2011). Towards a rule-based approach to monetary policy evaluation in Sub-Saharan Africa. *Journal of African Economies*, **20**(suppl_2): ii36-ii66.

Passari, E. and Rey, H. (2015). Financial flows and the international monetary system. *The Economic Journal*, **125**(584): 675-698.

Piesse, J. and Hearn, B.A. (2012). The law of one price: an examination of price integration between Europe and regional markets in Africa. *Applied Economics*, **44**(24): 3169-3193.

Portes, R. and Rey, H. (2002). The determinants of cross-border equity transaction flows. *Journal of International Economics*, **65**(2): 269-296.

Rajan, R.G. and Zingales, L. (2003). The great reversals: the politics of financial development in the twentieth century. *Journal of Financial Economics*, **69**(1): 5-50.

Raubenheimer, H. (2010). Concentration in the South African equity market and its implied restrictions on the long only equity fund manager's opportunity set. *South African Journal of Business Management*, **41**(4): 1-10.

Rey, H. (2015). *Dilemma not trilemma: the global financial cycle and monetary policy independence* (No. w21162). National Bureau of Economic Research.

Rey, H. (2016). International channels of transmission of monetary policy and the Mundellian trilemma. *IMF Economic Review*, **64**(1): 6-35.

Rodrik, D. (2000). How far will international economic integration go? *The Journal of Economic Perspectives*, **14**(1): 177-186.

Romer, C.D. and Romer, D.H. (1989). Does monetary policy matter? A new test in the spirit of Friedman and Schwartz. *NBER Macroeconomics Annual*, **4**: 121-170.

Romer, C.D. and Romer, D.H. (2004). A New Measure of Monetary Shocks: Derivation and Implications. *American Economic Review*, **94**(4): 1055-1084.

Sahay, R., Cihak, M., N'Diaye, P., Barajas, A., Ayala Pena, D., Bi, R., Gao, Y., Kyobe, A., Nguyen, L., Saborowski, C. and Svirydzenka, K. (2015). *Rethinking Financial Deepening: Stability and Growth in Emerging Markets* (No. 2015/008). International Monetary Fund.

Sala, H. and Trivín, P. (2014). Openness, investment and growth in sub-Saharan Africa. *Journal of African Economies*, **23**(2): 257-289.

Saxegaard, M. (2006). *Excess Liquidity and Effectiveness of Monetary Policy: Evidence from Sub-Saharan Africa* (No. 2006/115). International Monetary Fund.

Schindler, M., (2009). Measuring Financial Integration: A New Data Set. *IMF Staff Papers*, **56**(1): 222-238.

Shiller, R.J. (2017). Narrative Economics. *The American Economic Review*, **107**(4): 967-1004.

Simoes, A.J.G. and Hidalgo, C.A. (2011). The economic complexity observatory: An analytical tool for understanding the dynamics of economic development. In *Proceedings of the 17th AAAI Conference on Scalable Integration of Analytics and Visualization* (January) :39-42 and *Workshops at the 25th AAAI Conference on Artificial Intelligence*. (August).

Slavov, S.T. (2013). De jure versus de facto exchange rate regimes in Sub-Saharan Africa. *Journal of African Economies*, **22**(5): 732-756.

Stock, J.H. and Watson, M.W. (2001). Vector autoregressions. *Journal of Economic Perspectives*, **15**(4): 101-115.

Stock, J.H. and Watson, M.W. (2002). Has the Business Cycle Changed and Why? *NBER Macroeconomics Annual*, **17**: 159-218.

Stocker, M.L. (2005). Equity Returns And Economic Freedom. *Cato Journal*, **25**(3): 583-594.

Stocker, M.L. (2016). Crisis facilitates policy change, not liberalization. *Journal of Financial Economic Policy*, **8**(2): 248-267.

Svirydzenka, K. (2016). *Introducing a New Broad-based Index of Financial Development*. International Monetary Fund.

Swanson, E.T. (2015). *Measuring the effects of unconventional monetary policy on asset prices* (No. w21816). National Bureau of Economic Research.

Tapsoba, S.J.A. (2009). Trade intensity and business cycle synchronicity in Africa. *Journal of African Economies*, **18**(2): 287-318.

Weber, K., Davis, G.F. and Lounsbury, M. (2009). Policy as myth and ceremony? The global spread of stock exchanges, 1980–2005. *Academy of Management Journal*, **52**(6): 1319-1347.

Wilenius, M. (2014). Leadership in the sixth wave—excursions into the new paradigm of the Kondratieff cycle 2010–2050. *European Journal of Futures Research*, **2**: 1-11.

Wucker, M., 2016. *The Gray Rhino: How to recognize and act on the obvious dangers we ignore*. Macmillan.

Yameogo, N.D., Nabassaga, T., Shimeles, A.B.E.B.E. and Ncube, M. (2014). Diversification and sophistication as drivers of structural transformation for Africa: The economic complexity index of African countries. *Journal of African Development*, **16**(2): 1-39.

Yildirim, Z. (2016). Global financial conditions and asset markets: Evidence from fragile emerging economies. *Economic Modelling*, **57**: 208-220.

Yildirim, Z. (2022). Global financial risk, the risk-taking channel, and monetary policy in emerging markets. *Economic modelling*, **116**: 106042.

Zaremba, A. and Maydybura, A. (2019). The cross-section of returns in frontier equity markets: Integrated or segmented pricing? *Emerging Markets Review*, **38**: 219-238.