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Will China's Recovery Affect Prospects for Economic Growth in Africa?

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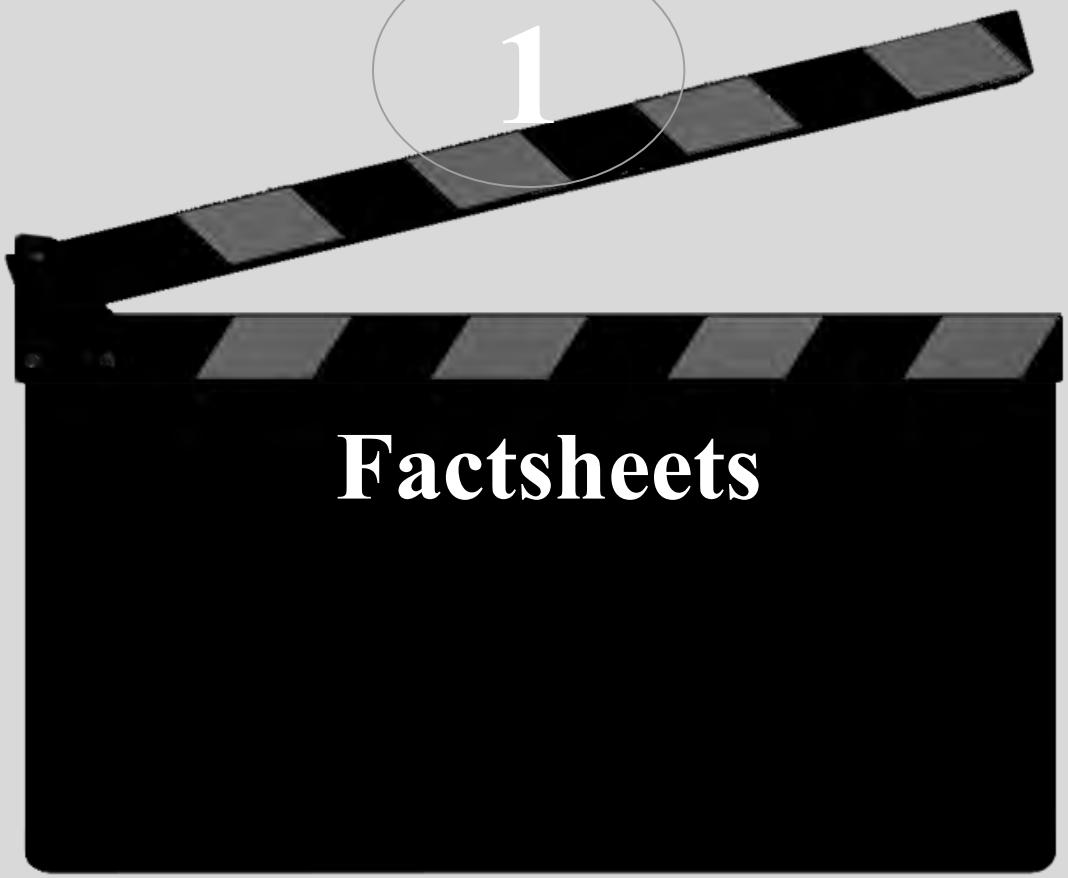
Outline

1. Factsheets
2. Literature Overview
3. Method & Empirical Results
4. Concluding Remarks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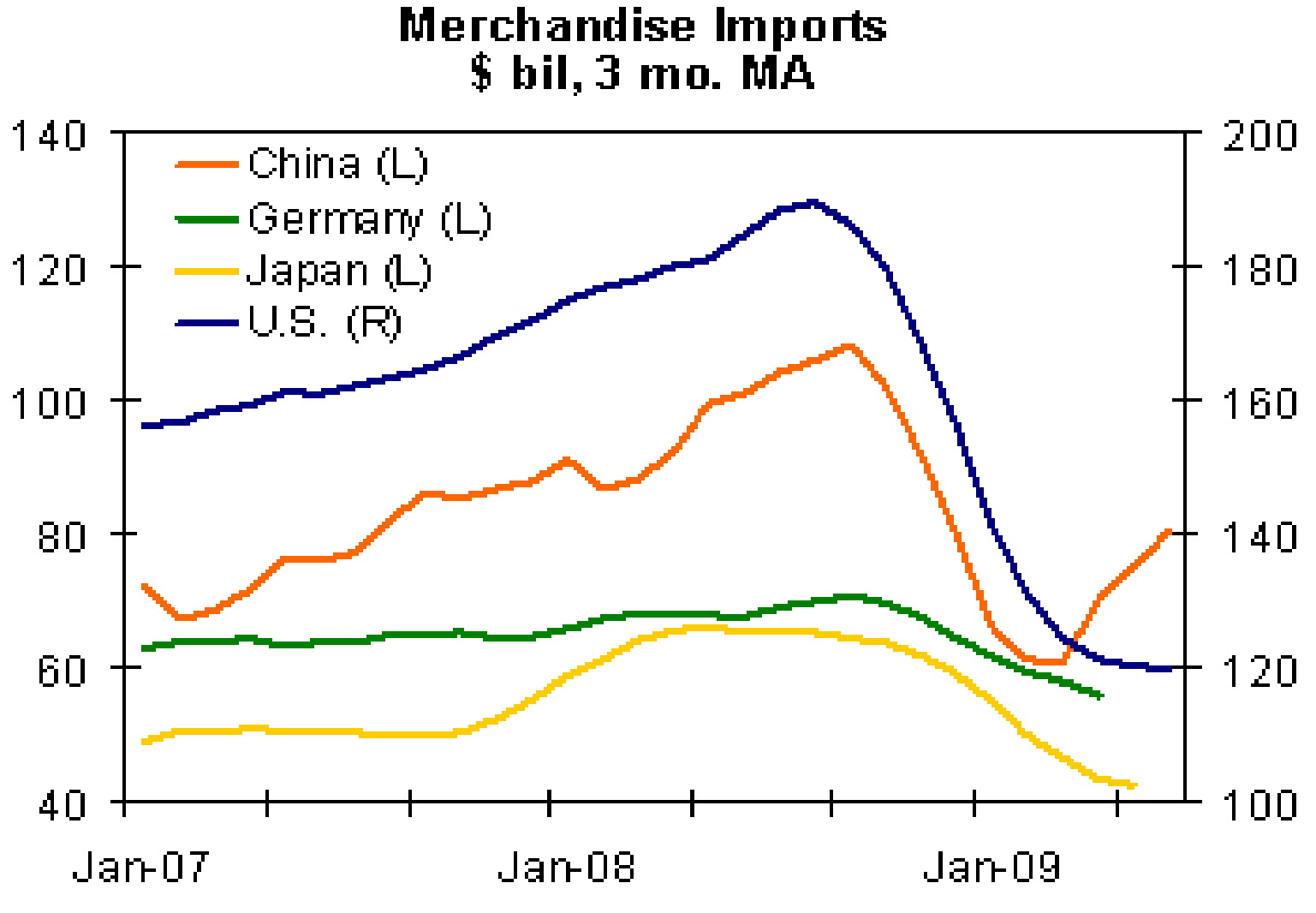
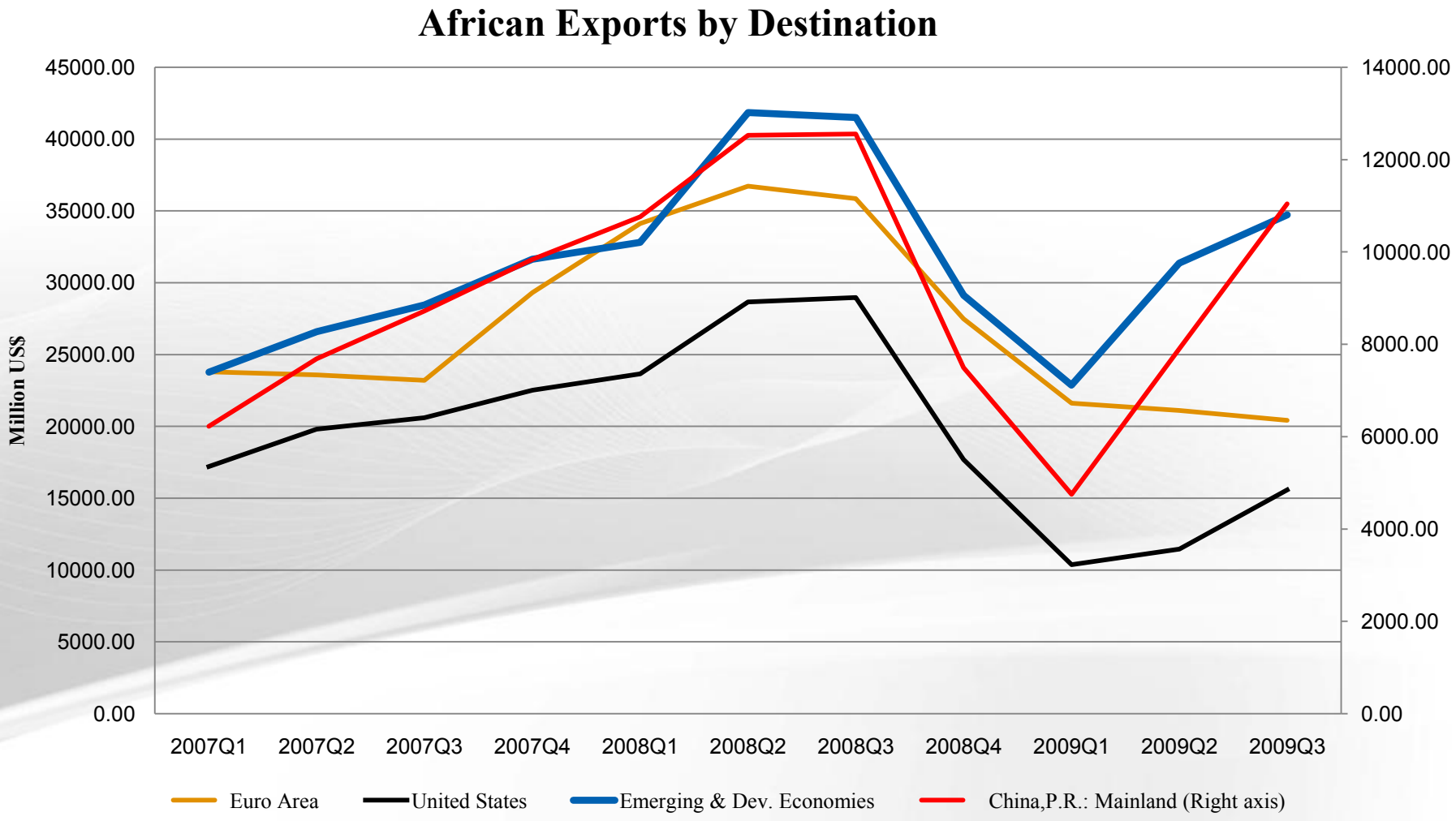
Factsheets

By the end-2009, the global economy had expanded, pulled up by the strong performance of China, which has contributed to driving the recovery in its trading partners…

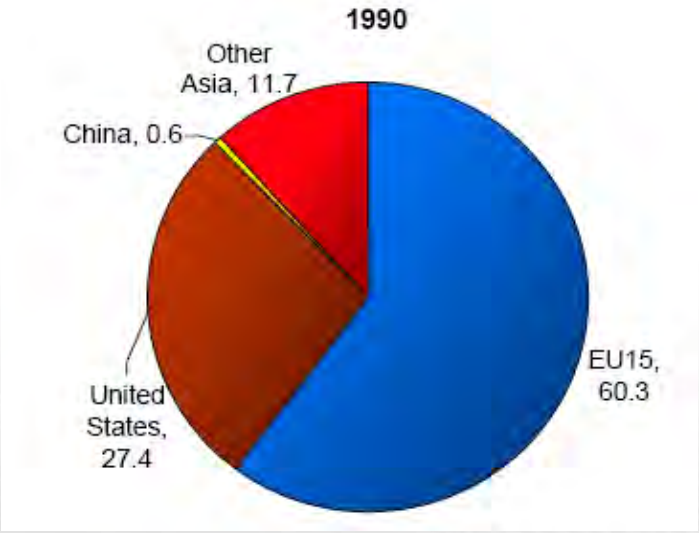


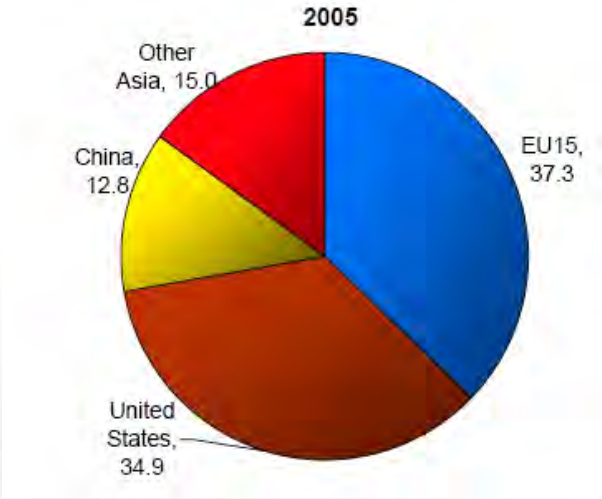
Source: Thomson DataStream, 2009

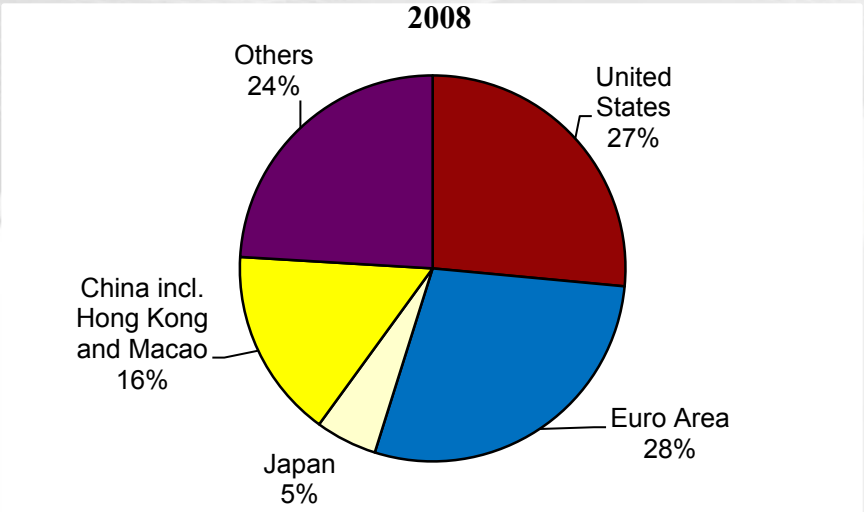
…among them those in Africa where exports have recovered since Q12009.



Destination Shares of Sub-Saharan African Exports

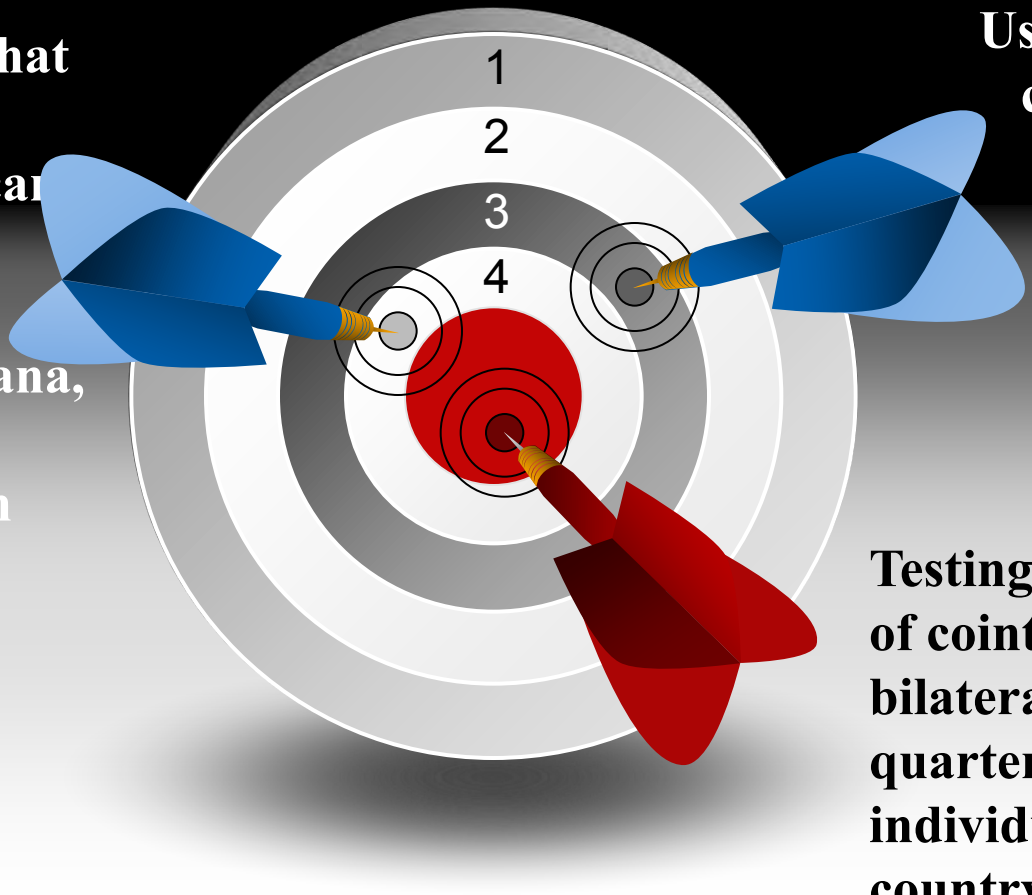






Aims

To determine to what extent aggregate outputs of China can influence those of selected African economies (Botswana, Kenya, Ghana, Nigeria, and South Africa)



Using nonlinear cointegration: threshold cointegration (TAR)

Testing the presence of cointegration in bilateral annual and quarterly GDP of individual African country and China.

2

Literature Overview

Comovement

Macroeconomic interdependence/Co-movement

Co-movement refers to a strong correlation among aggregate outputs of different economies

Business cycles	Synchro	Channels
•Distinguish the effects of country-specific or common shocks on economic growth (e.g., Glick and Rogoff, 1995). •Some shocks are neutral in the long run (e.g., monetary shocks), while others are assumed to have permanent effects on economic growth (e.g., productivity/ technology shocks).	•More concerned with identifying the presence of common shocks (e.g., Gregory et al., 1997; Kose et al., 2008) than with analyzing the nature of their duration (as transitory or permanent). •More focused on measuring the level of synchronization between the outputs of the economies involved.	•Focus on identifying a number of variables that can influence or mediate the transmission of a shock from one country to another (e.g.,Frankel & Rose,1998). •Commodity trade transmits economic fluctuations across economies, leading to a high degree of synchronization in growth rates (e.g., Kraay and Ventura ,1995) .

Empirical evidence has typically relied on 2 measures of output synchronization (IMF, 2007).:
(1) bilateral output correlations;
(2) share of output variances that can be attributed to unobservable common factors.

Empirics of Comovement

Macroeconomic interdependence/Co-movement

Co-integration

Cointegration	Linearity	Non-linearity
•Selover and Jensen (1999) and Girardin (2005) support the idea that a co-integration relationship is technically possible even between weakly linked economies. •Mode locking: systems with a tendency to oscillate, such as economies, will affect the timing of each other's oscillations.	A number of studies (e.g. Barrett, 2001; Fackler and Goodwin, 2001; Goodwin and Piggot, 2001) have questioned the appropriateness of linear co-integration models, arguing that they ignore the transaction costs that might be incurred.	•Recent studies (e.g., Henry and Summers, 2000) apply a nonlinear co-integration models . •Their analysis found that an exogenous negative shock will be more persistent, leading to greater output volatility, and have a greater impact on growth than a positive shock of equal magnitude.

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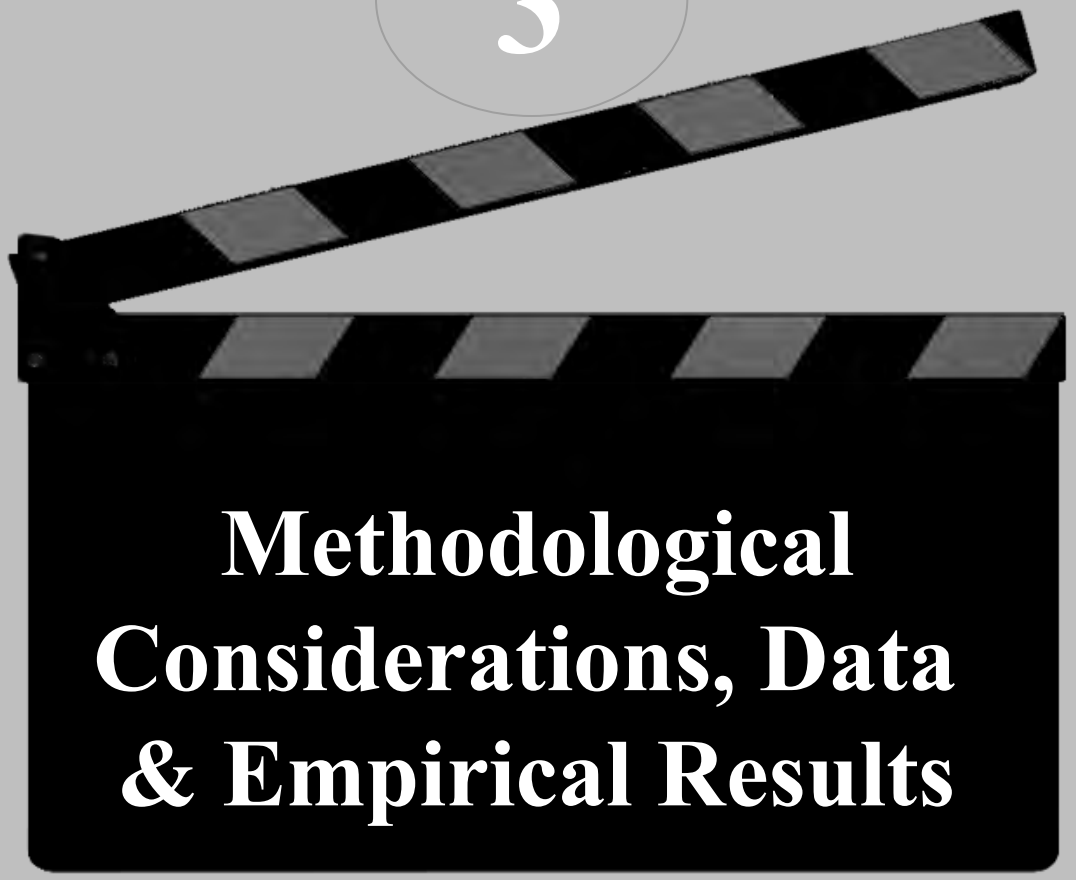


Methodological Considerations, Data & Empirical Results

TAR Model

$$x_{1t} = \beta_0 + \beta_2 x_{2t} + \mu_t$$

$$\Delta\mu_t = \rho\mu_{t-1} + \varepsilon_t$$

$$\Delta x_{it} = \alpha_i (x_{1t-1} - \beta_0 - \beta_2 x_{2\,t-1}) + \nu_{it}$$

$$\Delta\mu_t = \rho_1 \mu_{t-1} + \varepsilon_t \text{ if } \mu_{t-1} \geq 0$$
$$\Delta\mu_t = \rho_2 \mu_{t-1} + \varepsilon_t \text{ if } \mu_{t-1} < 0$$

Indicator function (dummy variable)

$$I_t = 1 \text{ if } \mu_{t-1} \geq \tau$$
$$= 0 \text{ if } \mu_{t-1} < \tau$$

Error-correction form:

$$\Delta x_{it} = \rho_{1.i} I_t \mu_{t-1} + \rho_{2.i} (1-I_t) \mu_{t-1} + \ldots + \nu_{it}$$

Testing the Threshold Effects

Chan's (1993) grid search methodology

1. Estimate $\{\mu\}$
2. Sort $\{\mu\}$ in ascending order to obtain:
   $$\mu_1^{\tau} < \mu_2^{\tau} < \ldots < \mu_T^{\tau}$$
3. Discard smallest + largest 15% of the μ_i^{τ}
4. Re-estimate relevant equations and consistent estimate is one that yields lowest SSR

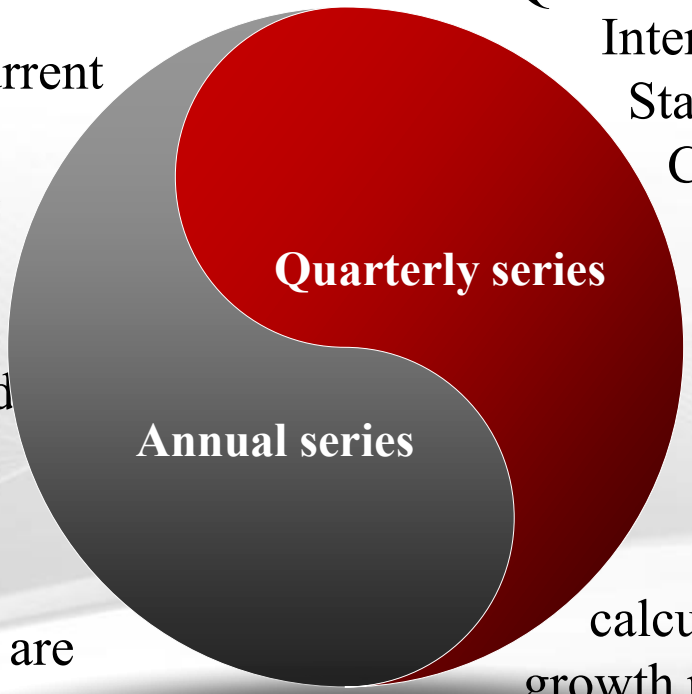
TAR & TECM tests

Test null hypothesis of linearity by testing restrictions on coefficients ρ1 and ρ2 (*F*-statistics for H_0 of symmetric adjustment H_0 of no-cointegration using critical values taken from Enders & Siklos (2001).

Data Sets

Quarterly GDP data series, Botswana and South Africa, for the sample period 1995Q1 to 2009Q3 are from the IMF's International Financial Statistics (IFS) January 2010 CD-ROM.

Annual real GDP (in current $US) for 1980 through 2009. The source of the data for 1980 to 2005 is the World Bank's World Development Ind (2008).
Data for 2006 to 2009 are from the IMF, 2009 (the GDP data for 2009 are estimates).



Quarterly data for China are from two sources: IMF's IFS for the period 1999Q1 to 2009Q2, and own calculations based on quarterly growth rates provided in Abeysinghe and Rajaguru (2004) for the period 1995Q1 to 1998Q4.

Unit Root Results

- Augmented Dickey–Fuller (1979) tests,
- The Akaike information criterion is used to determine *p*, the lag parameter.
- The tests performed include either a simple intercept or a linear time trend.

Annual series

	Level		First Difference	
Annual Series				
	Intercept	Intercept & Trend	Intercept	Intercept & Trend
China	–2.436 (0.110)	–2.878 (0.196)	–5.226 (0.002)*	–5.112 (0.001)*
Kenya	–3.080 (0.393)	–3.032 (0.140)	–5.728(0.000)*	–5.615 (0.000)*
Ghana	–3.256 (0.127)	–3.343 (0.080)**	–5.841(0.000)*	–5.797(0.000)*
Nigeria	–2.082 (0.307)	–2.999 (0.197)	–9.703 (0.000)*	–9.706 (0.000)*
Quarterly series				
China	–0.516 (0.857)	–1.150 (0.910)	–3.441(0.013)*	–3.624 (0.037)*
Botswana	–0.515 (0.879)	–3.709 (0.29)	–11.880(0.000)*	–11.774 (0.000)*
South Africa	1.100 (0.997)	–1.615 (0.774)	–3.602 (0.008)*	–3.926 (0.012)*

Notes: 1. The figures in parentheses are p-values. They are based on MacKinnon (1996).
2. * and ** denote significance at the 5% and 10% levels, respectively.

TAR and TVECM Results

$\hat{\rho}_1$	$\hat{\rho}_2$	$\hat{F}_C$	$\hat{F}_A$	l	γ_1 [3]	γ_2 [3]	JB-LM [4] (p-val.)	BG [5] (p-val.)-
4.1. Kenya–China								
–0.006 (–3.167)**	–0.001 (-2.02)*	4.895*	5.863*	1	–0.18 (0.23)	–0.002 * (0.06)	3.416 (0.388)	6.061 (0.098)
4.2. Ghana–China								
–0.055 (–1.242)	–1.025 (–1.42)	0. 640	2.516	1	0.136 (1.731)	0.022 (0.367)	2.21 (0.000)	10.36 (0.269)
4.3. Nigeria–China								
–0.001 (–2.121)*	–0.013 (–2.27)**	5.224*	6.114**	1	–0.002** (0.003)	–0.015** (0.032)	16.731 (0.304)	9.127 (0.360)
TAR tests on Quarterly GDP								
4.4. Botswana–China								
–0.0006 (–2.445)**	–0.026 (–1.49)	4.138*	5.927*	3	–0.003 (-0.366)	–0.009 (-0.175)	12.64 (0.645)	27.896 [5] (0.101)
4.5. South Africa–China								
–0.001 (–1.966)*	–0.03 (–3.18)**	7.968*	8.004**	2	–0.006 *(0.058)	–0.029 **(0.002)	21.61 (0.523)	4.722 (0.519)

Notes:

1. ** and * denote significance at the 5% and 10% levels, respectively. The selection of the lag length l is based on the Akaike Information Criterion, AIC (Akaike, 1974).
2. The t statistics are in parentheses. $\hat{F}_C$ and $\hat{F}_A$ denote, respectively, the F-statistics for the null hypothesis of symmetric adjustment ($\rho_1 = \rho_2$) and the test statistic for the null hypothesis of no-co-integration ($\rho_1 = \rho_2 = 0$). The critical values are taken from Enders and Siklos (2001).
3. γ_1 and γ_2 are the error-correction terms associated respectively with Z^+ and Z^- as in Equation (4)
4. Results of the Jarque–Bera normality test (see Jarque and Bera, 1980).
5. Results of the Breusch–Godfrey serial correlation.

4

Concluding Remarks

Findings and Concluding Remarks

Among African countries there are differences in adjustment patterns of GDP relative to that of China.

Adjustment to positive gap

- In Kenya, the speed of adjustment is more rapid for positive than for negative discrepancies. One possible explanation is the different levels of economic integration and bilateral trade intensities for different African countries, as well as differences in composition of the economies of these countries and of their trade with China.

Adjustment to negative gap

- The aggregate outputs of Nigeria and South Africa adjust relatively quickly to offset lower levels with respect to their long-term trends with China's GDP.

Nigeria and South Africa are likely to reap the benefits of China's recovery at a faster pace than Kenya.

➢Nigerian and South African exports to China consist mainly of oil and mining-related commodities, which enter the production process (as supply-side factors) and are expected to recover as soon as an upturn in output occurs.

➢Kenyan exports, by contrast, are textile and food related (and hence are demand-side/consumption factors), so they are not expected to exhibit a significant recovery until much later.

Thank You Very Much