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Inflation differentials in the African economic community

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INFLATION DIFFERENTIALS IN THE AFRICAN ECONOMIC COMMUNITY

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IES Working Paper 3/2025

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Inflation Differentials in the African Economic Community

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Abstract:

This paper examines the determinants of inflation differentials across member states of the African Economic Community (AEC). The results suggest that exchange rate depreciation, GDP per capita growth, price divergence, fiscal deficit, and periods of economic instability all contribute to higher differentials. On the other hand, differentials are not significantly influenced by a country's output gap and the persistence of its differentials. Given that price stability and low differentials are essential for monetary integration and improved welfare in the AEC, this study concludes that policies aimed at exchange rate stabilization, fiscal discipline, and fiscal coordination may be beneficial for member states.

JEL Classification: E31, F41

Keywords: Inflation differentials, exchange rate, fiscal deficit, GDP per capita growth, price divergence, economic instability, panel data

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1 Introduction

Since the inception of the African Economic Community (AEC), member states have experienced varying degrees of success in maintaining stable prices within their respective economies. For instance, over the past decade, a few countries, such as Benin and Cameroon, have successfully kept inflation around the regional target of 3%, while others have seen inflation rates surge more than threefold.¹ Based on the optimum currency area literature, these inflation differentials might be of interest for two reasons. To begin with, the prospects of having a regional monetary union, as outlined in the treaty establishing the AEC, cannot be materialized with large differentials occurring between prospective member states. Secondly, for subregional monetary unions like the Common Monetary Area and the West African Economic and Monetary Union, large inflation differentials may constrain a “one-size-fits-all” monetary policy due to low-inflation countries having different policy requirements compared to high-inflation countries.

On a more general note, large inflation differentials may also have welfare implications. For countries on the high end of the inflation spectrum, national inflation rates may severely encroach on fixed nominal incomes, real investment returns, and wage negotiations (Honohan & Lane 2003). Furthermore, with a continental free trade agreement already in place, wide inflation disparities imply that there might be inflation spillovers from high- to low-inflation countries through input linkages and arbitrage opportunities.²

Inflation differentials might arise from various macroeconomic factors. Some of the commonly referenced factors in the literature include demand shocks, exchange rate fluctuations, price convergence effects, fiscal balance, income per capita, the persistence and expectations of these differentials, domestic costs, and productivity shocks (see Lagoa 2017, Stylianou 2023). These factors affect inflation differentials differently. For instance, a depreciation of the domestic currency might amplify a country’s differential, whereas a fiscal surplus or negative demand shocks might lower the differential. Additionally, in the context of price convergence, countries with lower aggregate price levels might experience higher differentials than those with higher aggregate price levels (Horvath & Koprnicka 2008).

This study investigates inflation differentials in the AEC using a panel data model that aims to combine cyclical and structural determinants. There are already more than a dozen empirical studies on the determinants of cross-country inflation differentials, but none is peculiar to the AEC. The panel model employed accomplishes two critical objectives. Firstly, it allows us to verify whether there is a price convergence effect, and secondly, whether conventional determinants, namely, demand shocks, exchange rate fluctuations, and fiscal balance can help explain inflation differentials, as in the euro area and its prospective members.³

The results suggest that cross-country inflation differentials stem from exchange rate fluctuations, GDP per capita growth, price divergence, fiscal deficit, and periods of economic instability. Regarding

¹Regional inflation targets for the AEC and prospective members of the African Monetary Union are set by the Association of African Central Banks (AACB).

²International inflation spillovers are discussed in detail by Auer et al. (2019).

³Some studies showing these variables influence euro area inflation differentials include Zdarek & Aldasoro (2009), Stylianou (2023), Checherita-Westphal et al. (2024).

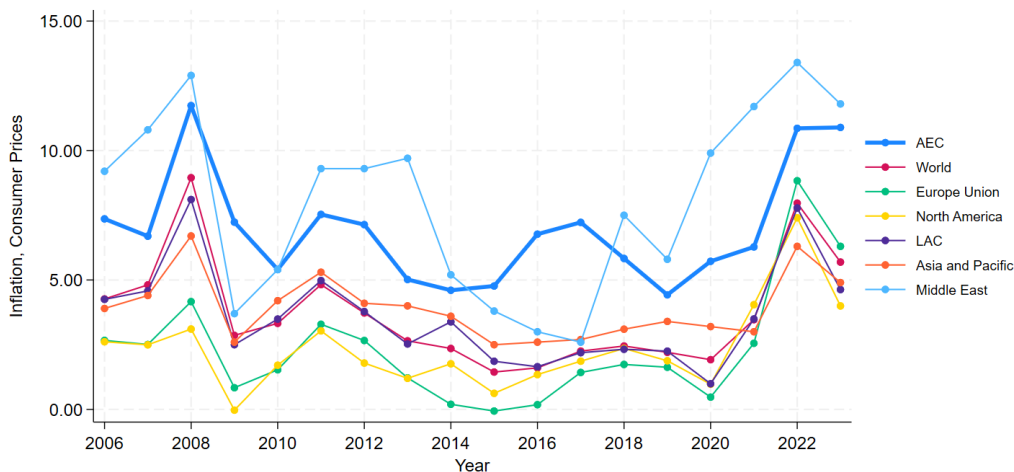
exchange rate fluctuations, the pass-through to differentials appears to be more pronounced during cycles of large depreciation. On the contrary, the results suggest that demand shocks (the output gap) and the persistence of differentials do not matter. Based on these results, policies aimed at exchange rate stabilization, fiscal prudence, and fiscal coordination among member states can help narrow the observed dispersions in national inflation rates.

The remaining parts of this paper are organized as follows: Section 2 presents stylized facts on inflationary trends in the AEC; Section 3 briefly reviews the related literature; Section 4 discusses the empirical model; Section 5 presents the results; and Section 6 contains the conclusion.

2 Stylized Facts on Inflation Developments in the African Economic Community

The African Economic Community (AEC) produces some of the world’s highest inflation rates. Between 2006 and 2023, inflation averaged about 6.82% but also peaked at around 11% in the years surrounding the global financial crises, the COVID-19 pandemic, and the Ukrainian war. Figure 1 helps illustrate the path of AEC inflation and how it compares to other regional inflation indices. In the figure, AEC inflation is second only to that of the Middle East and consistently surpasses the global inflation rate. Additionally, there is no declining trend in the inflation rate, suggesting that yearly, a substantial share of global inflation originates from the region.

Figure 1: Inflation in the AEC is among the highest globally



Notes: Datasets for inflation, excluding the Middle East, were retrieved from the World Bank’s World Development Indicators; Data on the Middle East was retrieved from the IMF’s International Financial Statistics database; Inflation rates on vertical axis in percentage points.

Table 1 provides a statistical summary of the AEC as a whole and its individual economies during the sample period.⁴ Here, we can observe that Ghana, Ethiopia, and Angola have the highest average inflation rates, while Morocco, Togo, and Cameroon have the lowest. We can also observe that regional inflation persistence, as displayed in Figure 1, stems from most of the member states having elevated

⁴The stylized facts focus mainly on the 44 economies covered in the study sample.

inflation rates. More precisely, about half of all member states have mean and median inflation rates exceeding 5%. Among these, nine have double-digit inflation rates, while an additional five, led by Sao Tome and Principe, Nigeria, and Uganda, have inflation rates nearing double digits.

Table 1: Statistical summary

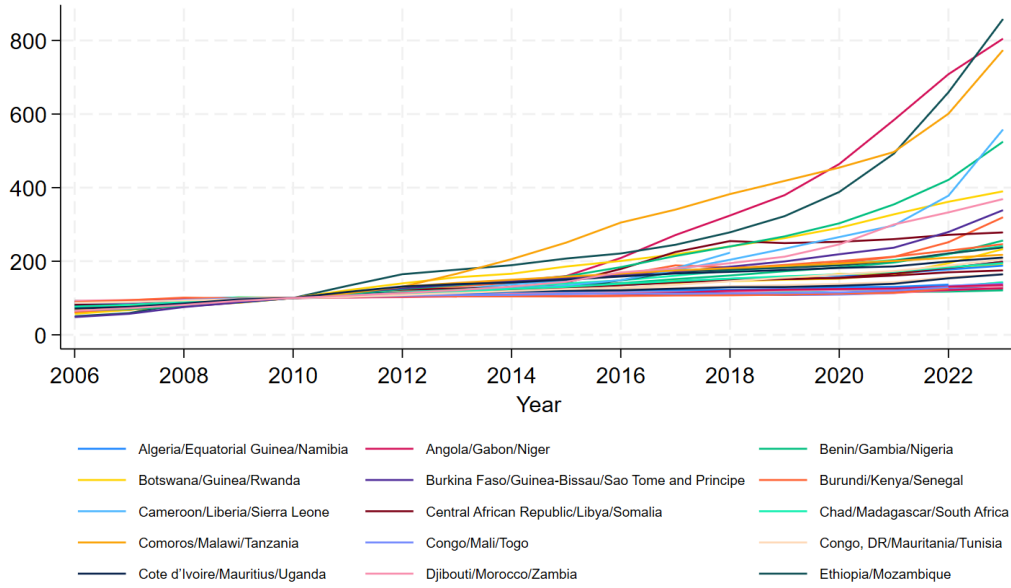
No.	Country	Mean	Diff.	Med.	SD	Obs.	No.	Country	Mean	Diff.	Med.	SD	Obs.
1	Ghana	22.28	15.46	15.71	18.49	18	23	Mauritania	5.70	-1.12	4.94	7.76	18
2	Ethiopia	17.50	10.68	15.04	9.95	18	24	Mozambique	5.27	-1.55	4.92	2.75	18
3	Angola	15.05	8.23	17.38	13.53	18	25	Tunisia	5.26	-1.56	4.66	1.91	18
4	Malawi	14.97	8.15	13.06	7.15	18	26	Congo	4.99	-1.83	8.85	14.31	18
5	Congo, DR	14.24	7.42	13.25	11.73	18	27	Liberia	4.79	-2.03	5.03	5.48	18
6	Sierra Leone	12.66	5.84	10.06	8.03	18	28	Equat. Guinea	4.01	-2.81	3.95	13.40	18
7	Libya	11.14	4.32	3.02	28.68	18	29	CAR	3.86	-2.96	3.26	2.81	18
8	Zambia	10.57	3.75	9.90	4.64	18	30	Mali	3.68	-3.14	3.12	2.75	18
9	Guinea	10.18	3.36	9.20	7.92	18	31	Mauritius	3.59	-3.23	2.52	3.05	18
10	Sao T. and P.	9.88	3.06	8.79	5.70	18	32	Guinea-Bissau	3.47	-3.35	2.77	5.64	18
11	Nigeria	9.52	2.70	9.86	4.99	18	33	Gabon	3.21	-3.61	2.68	11.30	18
12	Uganda	9.40	2.58	4.85	18.51	18	34	Niger	2.96	-3.86	2.76	2.62	18
13	Burundi	9.23	2.41	8.44	6.85	18	35	Djibouti	2.95	-3.87	2.10	2.30	18
14	Kenya	9.10	2.28	7.46	6.54	18	36	Senegal	2.52	-4.30	1.60	2.95	18
15	Madagascar	7.62	0.80	7.21	1.94	18	37	Burkina Faso	2.48	-4.34	2.20	3.16	18
16	Tanzania	6.97	0.15	6.95	3.83	18	38	Cote d'Ivoire	2.32	-4.50	2.03	1.96	18
17	Namibia	6.32	-0.50	6.43	3.04	18	39	Comoros	2.17	-4.65	1.79	1.57	18
18	Botswana	6.29	-0.53	5.59	5.06	18	40	Chad	2.16	-4.66	1.98	6.43	18
19	Rwanda	6.15	-0.67	4.88	4.56	18	41	Benin	2.13	-4.69	1.51	2.21	18
20	Algeria	6.01	-0.81	5.55	8.46	18	42	Cameroon	2.13	-4.69	1.98	1.43	18
21	South Africa	5.89	-0.93	5.54	1.28	18	43	Togo	2.09	-4.73	1.84	2.28	18
22	Gambia	5.76	-1.06	5.43	2.78	18	44	Morocco	1.48	-5.34	0.95	1.56	18
All									6.82		4.96	9.72	792

Notes: Statistical summary from 2006 - 2023. Countries ranked in descending order by mean inflation. No. = Serial Number; Diff. = Mean inflation differential; Med. = Median; SD = Standard Deviation; Obs. = Observations. Congo, DR = Democratic Republic of Congo; Sao T and P. = Sao Tome and Principe; Equat. Guinea = Equatorial Guinea; CAR = Central African Republic.

At the national level, inflationary trends within the AEC are considerably heterogeneous. As shown in Table 1, apart from contrasting national inflation rates, there are wide variations in inflation volatility, indicating that price fluctuations are more pronounced in some countries than in others. Differences in inflation differentials are also substantial, as a gap of about 21% lies between Morocco, the country with the lowest differential, and Ghana, the country with the highest. Figures 2 and 3 shed more light on individual and relative inflationary trends in the AEC during the period under review. Figure 2 illustrates each country's price level trajectory, while Figure 3 depicts the annual cross-sectional standard deviation of inflation. Both figures demonstrate a lack of homogeneity or convergence, corroborating Table 1. In the former, price levels move along different trajectories, revealing substantial price level divergence among the countries. On the other hand, the latter reveals a high degree of inflation dispersion. The average cross-sectional standard deviation is about 6.36%. Even the lowest point in 2015 exceeds 4% by a significant margin.

As discussed in Section 1, the observed disparities in national inflation trends have broad implications that might be of interest to policymakers. For example, countries with above-average inflation

Figure 2: Price level divergence



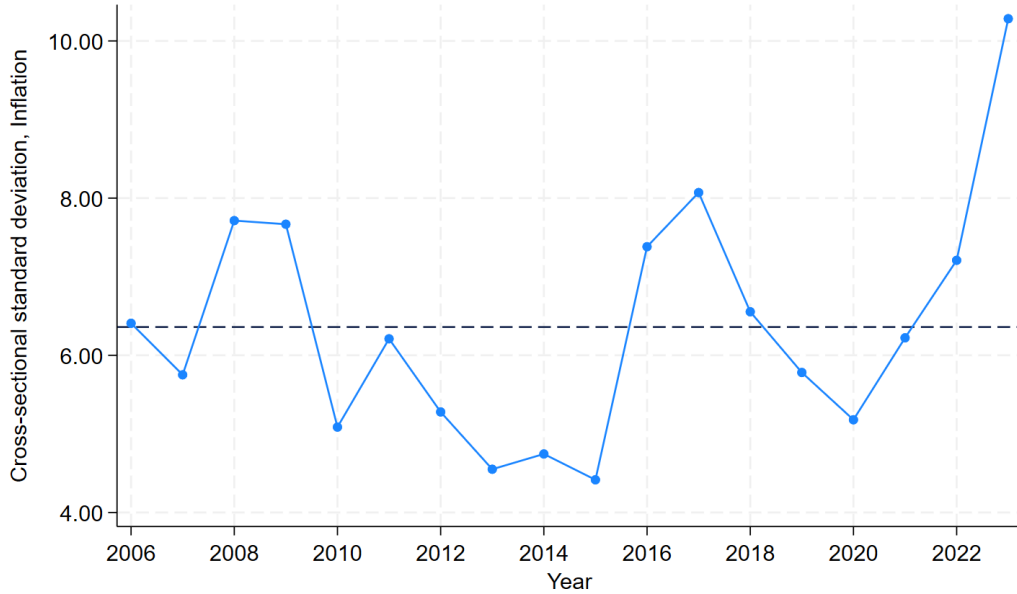
Notes: Datasets on consumer price levels were retrieved from the World Bank's World Development Indicators and the IMF's International Financial Statistics database.

rates (or positive inflation differentials) are likely to have lower real income growth, and periods of divergence are likely to be accompanied by intraregional inflation spillovers, which may occur through input linkages and cross-border trade. Furthermore, in sub-regional monetary unions like the West and Central African Franc Zones, high inflation dispersion may undermine the success of a “one-size-fits-all” monetary policy approach, as postulated in the Optimum Currency Area literature.

Finally, it is worth mentioning that the AEC does not have a universal framework for keeping inflation under control. Member states operate monetary policy frameworks with varying approaches to price stabilization. These include exchange rate anchoring, monetary aggregate targeting, inflation targeting, or a combination of these frameworks. Details on each country's framework are presented in Table A.2. In monetary and inflation targeting, monetary aggregates and medium-term inflation forecasts act as the intermediate targets of monetary policy, respectively. The monetary aggregate could be reserve money, narrow money, or broad money. On the other hand, in exchange rate anchoring, the exchange rate serves as the intermediate target of monetary policy. It is targeted via shared legal tender, currency boards, pegs, and other managed arrangements.⁵ AEC countries that have adopted exchange rate anchoring as their primary policy framework generally experience lower inflation rates, highlighting the potential benefits of coordinated monetary frameworks. This is evident in Table 1 where most of the countries with low inflation rates have their currencies pegged to the Euro or the United States dollar, whereas those with high inflation rates have independent policy frameworks involving either monetary aggregate targeting, inflation targeting, or a combined framework.

⁵Descriptions of the various monetary policy regimes are based on the IMF's annual report on exchange arrangements and restrictions (see International Monetary Fund 2023).

Figure 3: Cross-sectional standard deviations of inflation rates



Notes: Annual cross-sectional standard deviations of inflation rates among the 44 countries in the sample during the period 2006 - 2023; Inflation rates in percentage points.

3 Review of Related Literature

3.1 Euro area studies

The literature employs a variety of models and methods in analyzing the determinants of inflation differentials in the euro area and its prospective members: Honohan & Lane (2003) propose a panel model for the euro area, considering the effective exchange rate, output gap, fiscal deficit, and price level as potential determinants of inflation differentials from 1999-2001. They also consider the potential effects of productivity and output per capita. Their results suggest that inflation differentials respond positively to the output gap, fiscal deficit, and depreciation of the effective exchange rate, but negatively to the price level due to price convergence. On the other hand, the effects of productivity and output per capita are statistically insignificant.

Altissimo et al. (2005) employ a calibrated three-sector model alongside measures of dispersion and a dynamic factor model to analyze the long-run determinants of inflation differentials in 10 euro area economies. Their results lead to three conclusions. First, inflation dispersion in the euro area is mostly pronounced in services and energy consumer prices. Secondly, inflation differentials might arise because countries respond differently to common, area-wide shocks. Thirdly, in contrast to the Balassa-Samuelson hypothesis (Balassa 1964, Samuelson 1964), inflation differentials mainly stem from asymmetric productivity shocks in the non-traded sector. However, even symmetric productivity shocks in the traded and non-traded sectors of a country can lead to sizeable inflation differentials.

Hofmann & Remsperger (2005) propose a New Keynesian model linking a country's inflation differential to its persistence, expectations, the output gap, the nominal effective exchange rate, and structural inflation. Using panel instrumental variables and a sample covering 11 euro area countries

from 1999Q1-2004Q2, they show that expectations, persistence, the output gap, and the nominal effective exchange rate actually explain euro area inflation differentials, whereas structural inflation does not. In addition, persistence appears to be insignificant in euro area countries with a history of low inflation. Based on these findings, Hofmann & Remsperger (2005) conclude that persistent inflation differentials in high-inflation euro area countries may diminish eventually, since the Eurosystem is inclined towards maintaining low and stable inflation rates in member states.

Angeloni & Ehrmann (2007) utilize an augmented Phillips curve alongside an output gap equation to shed light on the causes of inflation and output differentials in 12 euro area economies from 1998Q1-2003Q2. Their findings are twofold. The first is that inflation differentials are caused mainly by demand shocks, and only to a lesser extent by domestic cost-push shocks and euro exchange rate shocks. The second is that inflation persistence strongly amplifies inflation differentials in the euro area. To corroborate the second finding, they show that even small changes in persistence can dramatically alter inflation differentials in a model with plausible parameter values. They conclude that area-wide inflation targeting within a narrow band is likely to produce low cross-country inflation differentials.

Egert (2007) uses a simple accounting framework and panel estimation techniques to uncover the factors leading to price level and inflation divergence in Europe, including the euro area and the EU-27, from 1996 to 2005. Results based on the simple accounting framework reveal that service price inflation contributes less to inflation in transition economies than in euro-area countries. In contrast, energy and food prices contribute more. Furthermore, prices for goods and regulated services contribute equally to overall inflation in both country groups. On the other hand, the panel estimation techniques yield two main results. First, inflation persistence, cyclical effects, regulated prices, real convergence, and price convergence tend to affect inflation, while the Balassa-Samuelson effect, public finances, and other structural factors do not. Second, house and oil prices matter for the euro area, whereas the exchange rate matters for transition countries.

Zdarek & Aldasoro (2009) examine the determinants of inflation dispersion in a panel of eurozone states from 1999 to 2007. They observe that dispersion originates mainly from those components of the HICP consisting mainly of non-traded goods. Furthermore, using various panel regression methods, they find that only the output gap and price level convergence are significant determinants of inflation. Exchange rates and other conventional determinants have no impact.

Micallef & Cyrus (2013) utilize the variance decomposition of a dynamic stochastic general equilibrium model to investigate the determinants of inflation differentials in Malta relative to the eurozone from 2000Q1 to 2011Q2. They find that cost-push shocks (commodity prices) contribute the most to inflation differentials, followed by productivity shocks, wage mark-ups, demand shocks (government spending), and monetary shocks (the monetary policy rate). They also find notable differences between the variance decompositions of headline inflation in Malta and the euro area. In Malta, cost-push shocks are the most important, followed by productivity shocks and wage mark-ups. However, in the euro area, productivity shocks are the most important, followed by wage mark-ups and cost-push shocks.

Lagoa (2017) uses the New Keynesian Phillips Curve (NKPC) and imperfect competition model (ICM) to examine the determinants of inflation differentials in the 11 founding members of the euro area

and Greece from 1999Q1-2008Q4. Results based on the NKPC suggest that exchange rate movements and expected inflation play important roles in explaining inflation differentials, while persistence and other explanatory variables do not. On the contrary, results based on the ICM suggest that inflation differentials mainly depend on nominal unit labor cost (ULC) growth and the long-run disequilibrium between prices and costs. Based on these findings, Lagoa (2017) concludes that the ICM provides a better framework for identifying the determinants of inflation differentials.

Coutinho & Licchetta (2023) utilize principal component analysis and panel regression models to investigate the causes of inflation differentials in the euro area from 2000Q1 to 2022Q4. Their results show that a common shock related to energy and food prices accounts for about half of the increase in the 2022 euro area inflation. The impact of this common shock is amplified by energy intensity but weakened by the share of services in gross value added. It is also stronger from 2020 to 2022 than in past periods. Furthermore, inflation depends on its persistence and factors related to local costs and economic crises. However, omitting persistence (the lagged dependent variable) and controlling for residual autocorrelation, common factors explain up to two-thirds of the increase in inflation in 2022, whereas local drivers explain a more limited amount.

Messner et al. (2023) examine cross-border differences in grocery prices and inflation between Austria and Germany using household panel data from 2008 to 2018. They survey identical products sold in areas bordering both countries and find substantial assortment and price disparities. Even within the same multinational retailer, prices differ on average by around 21%. However, these price differences are only transitory, indicating minimal arbitrage gains from cross-border purchases. Product-level inflation rates are more homogenous and differ only in about half of the retail chains. The results link price differences to price discrimination based on existing logistics networks.

Panagiotis & Argyrios (2023) use a dynamic panel model to examine the determinants of inflation differentials in the first twelve member states of the eurozone from 1999 to 2020. Their results show that structural and cyclical factors mainly determine inflation differentials. These include inflation persistence, the output gap, and government balance. Price level convergence is also statistically significant but explains only a tiny part of the differentials. Given that persistent inflation differentials depend mainly on structural and cyclical factors, the study concludes that additional country-specific policies might be more efficient in achieving low inflation and inflation differentials in the twelve eurozone countries.

The model proposed by Stylianou (2023) considers public debt, fiscal position, the output gap, the exchange rate, and the growth rate of labor productivity in the business sector as potential determinants of euro area inflation differentials. Stylianou (2023) estimates the model for a panel of 19 euro area countries using data from 1999 to 2018 and tests for structural breaks in the inflation differentials series. The results indicate three breakpoints in 2004, 2008, and 2010 that correspond to events like the 2004 EU expansion, the 2008 financial crisis, and the 2010 Eurozone debt crisis. After incorporating the detected breakpoints into the model, the results reveal that productivity growth and exchange rate appreciation lead to narrow inflation differentials. In contrast, the output gap achieves the opposite effect. Based on these findings, the author concludes that homogenous real effective exchange rates

among euro area members and increased productivity growth may make inflation differentials less persistent.

Checherita-Westphal et al. (2024) examine the role of fiscal policy in explaining inflation differentials across 19 euro area countries over the period 1999–2019. They do not find robust evidence that fiscal policy directly affects inflation differentials. However, they find evidence that discretionary fiscal policy affects inflation differentials through the output gap channel. Fiscal policy may also affect differentials when output is above its potential level, with fiscal tightening (expansion) weakening (strengthening) inflationary pressures. Finally, regarding individual fiscal policy instruments, changes in the value-added tax rate and public wage growth significantly affect inflation differentials.

Finally, the model by Horvath & Koprnicka (2008), which forms the basis for the empirical analysis of this study, also considers the effective exchange rate, output gap, fiscal deficit, and price level as potential determinants of inflation differentials, as in Honohan & Lane (2003). Nonetheless, in contrast to Honohan & Lane (2003), the model investigates the distinctive features of new EU members, using data from 1997–2007. Results based on the model suggest that exchange rate appreciation and price convergence in new member states (NMS) lead to narrower differentials, while fiscal deficit and positive output gaps lead to greater differentials. Furthermore, among the determining factors, the price convergence effect dominates. The overall conclusion from these results is that real convergence factors carry more weight than cyclical variation in determining inflation differentials in the NMS compared to the euro area.

3.2 Other regional studies

A smaller fraction of the literature investigates the determinants of inflation differentials in regions other than the euro area: Hammermann & Flanagan (2009) examine the determinants of inflation differentials among 19 transition economies, including the Commonwealth of Independent States (CIS) and Central and Eastern European Countries (CEEC) from 1995 to 2004. The results show that price liberalization and trade openness are the main sources of inflation differentials. Furthermore, political stability matters but to a lesser extent. Based on these results, the study recommends price liberalization, trade openness, structural reforms, and central bank independence to help eliminate inflation differentials.

Mohaddes & Williams (2011) employ a pairwise approach to analyze the causes of inflation differentials between member states of the Gulf Cooperation Council (GCC) from 1991M1 to 2010M6. They show that the oil cycle influences inflation differentials in the GCC via fiscal and credit channels. Therefore, prior to forming a monetary union, increased integration can be achieved through closer coordination of fiscal policies. After controlling for cyclical factors, their results also reveal increased convergence during the sample period, including the oil boom era from 2003 to 2009.

Carrasco & Ferreiro (2014) employ non-habitual convergence tests to analyze the effect of inflation targeting on inflation convergence between Latin American countries and the United States from 1970 to 2011. They obtain three key results. First, inflation-targeting Latin American countries have lower inflation rates than their non-inflation-targeting counterparts. Second, the disinflationary process,

which began in developed countries, has spread to Latin America. Finally, non-inflation-targeting countries have also achieved lower levels of inflation and dispersion.

Umar & Dahalan (2016) investigate the causal relationship between exchange rate and inflation differentials in Brunei, Malaysia, and Singapore from 1980Q1 to 2015Q1, using the Toda–Yamamoto asymmetric causality test. The results establish the existence of Granger causality from positive exchange rate shocks to inflation differentials for Brunei and Malaysia. However, causality for Singapore runs from both positive and negative inflationary shocks to the exchange rate. These findings imply that effective exchange rate policies can achieve price stability in Brunei and Malaysia, whereas an effective price stabilization policy can stabilize the exchange rate in Singapore.

3.3 Summary

Several conclusions can be drawn from the literature review. First, there are notable differences among the empirical studies, especially in terms of explanatory variables and results. Studies on the euro area mainly consider the output gap (or demand shocks), effective exchange rate, and fiscal balance as potential determinants. To a lesser extent, they also consider productivity shocks, price level convergence, output per capita, inflationary persistence, inflationary expectations, structural inflation, regulated prices, real convergence, cost-push shocks (including commodity prices), wages, and price discrimination. In most cases, results concerning these explanatory variables differ across individual empirical studies. Apart from the output gap and inflationary expectations which are statistically significant in all studies in which they have been considered, explanatory variables found to be significant in some studies turn out to be insignificant in others. This heterogeneity also occurs among non-euro area studies. For instance, Hammermann & Flanagan (2009) identify price liberalization and trade openness as the main determinants of differentials in the Commonwealth of Independent States, whereas Mohaddes & Williams (2011) identify the oil price cycle as the main determinant in the Gulf Cooperation Council region.

Apart from differences in explanatory variables and regional scope, the possible causes of diverse results across empirical studies include differences in the methods and data used to investigate the determinants of inflation differentials. Another possible cause is the enlargement of the euro area. For instance, studies focusing on the euro area before its enlargement might obtain results different from studies focusing on the euro area after successive stages of enlargement.

Finally, it is worth mentioning that studies on regions other than the euro area are relatively scarce. The literature review includes only four of them. This represents an important gap to be filled in the empirical literature because other regions could have differing determinants of inflation differentials.

4 Empirical Methodology

This study utilizes panel data spanning 44 economies with annual observations from 2006 to 2023. These economies are members of the African Economic Community (AEC) and signatories to the African Continental Free Trade Area (AfCFTA) Agreement, planning to adopt a single currency in the

medium term.⁶

To explore the factors influencing inflation differentials across these economies, the study uses a modified version of the model by Horvath & Koprnicka (2008). This model, initially applied to the euro area and its acceding countries, describes a dynamic relationship between inflation differentials, a set of macroeconomic variables, and the price level:

$$\pi_{it} - \pi_t^T = \beta(z_{it} - z_t^T) + \delta(P_{it-1} - P_{t-1}^T) + \epsilon_{it} \quad (1)$$

In this equation, $(\pi_{it} - \pi_t^T)$ represents the differential between the national inflation rate (π_{it}) and its regional target (or regional average) (π_t^T); $(z_{it} - z_t^T)$ represents the differential between a vector of national variables affecting inflation in the short term (z_{it}) and their regional targets (z_t^T); $(P_{it-1} - P_{t-1}^T)$ represents the differential between the past national price level (P_{it-1}) and its regional target (P_{t-1}^T); and ϵ_{it} denotes the error term.⁷

From the model specification, we can derive a regression model with fewer terms by combining the regional variables into a time dummy, ϕ_t :

$$\pi_{it} = \phi_t + \beta z_{it} + \delta P_{it-1} + \epsilon_{it} \quad (2)$$

Here, the time dummy captures common movements in inflation, allowing the regression to explain inflation differentials in terms of country-specific shocks (Horvath & Koprnicka 2008).

The inflation rate is measured using GDP price deflator inflation, and the z -vector contains four variables: the output gap (Gap), GDP per capita growth (GDP_PG), fiscal deficit ($Fisc$), and nominal exchange rate ($ExRate$).⁸ Thus, the baseline model contains five main explanatory variables and takes the linear form:

$$\pi_{it} = \phi_t + \beta_1 Gap_{it} + \beta_2 GDP_PG_{it} + \beta_3 Fisc_{it} + \beta_4 \Delta ExRate_{it-1} + \delta P_{it-1} + \epsilon_{it} \quad (3)$$

In conformity with Horvath & Koprnicka (2008), the coefficient on output gap (β_1) is expected to be positive because a higher output gap might lead to higher inflation. Similarly, β_3 and β_4 are anticipated to be positive, as fiscal deficits and exchange rate depreciation might increase inflation by boosting aggregate demand and raising import prices, respectively.⁹ On the other hand, the price level coefficient (δ) is expected to be negative (positive), suggesting price level convergence (divergence). Finally, the coefficient on GDP per capita growth (β_2) is expected to be positive, as GDP per capita growth might

⁶The 44 economies are listed in Table 1 and Table A.2 (Appendix A). Somalia, Sudan, and Zimbabwe were excluded due to high political instability, as well as unusually high and volatile inflation rates during the study period. Their inclusion significantly distorts the results. However, results containing these countries are available upon request.

⁷Regional targets and convergence criteria for prospective members of the African Monetary Union (AMU), as outlined by the Association of African Central Banks (AACB), are available at <https://au.int>

⁸A detailed description of these variables is provided in Table A.1. Nominal exchange rates per dollar are employed because nominal effective exchange rates are not available for most of the countries in the study sample. The dollar is used because of its role as the dominant reserve and trade currency in the AEC.

⁹The exchange rate variable is measured in units of local currency per foreign currency. Therefore, an increase in the exchange rate implies a depreciation, whereas a decrease implies an appreciation.

increase inflation by raising disposable income, private consumption, and aggregate demand.¹⁰

Given the endogeneity of several explanatory variables to inflation, ordinary regression methods like pooled ordinary least squares (POLS) might lead to biased estimates. Therefore, to address potential endogeneity bias, this study uses the generalized method of moments (GMM) estimator by Blundell & Bond (1998), which corrects for endogeneity bias in panel data using instrumental variables.

Finally, in line with Coughlin & Pollard (2003), the baseline model is extended to accommodate asymmetry in the exchange rate pass-through to inflation differentials. First, the case of sign asymmetry is considered, whereby inflation differentials respond differently to exchange rate depreciation (positive shock) and appreciation (negative shock):

$$\pi_{it} = \phi_t + \beta_1 GDP_PG_{it} + \beta_2 Gap_{it} + \beta_3 Fisc_{it} + \beta_4^+ G_{it} \Delta ExRate_{it-1} + \beta_4^- G_{it} \Delta ExRate_{it-1} + \delta P_{it-1} + \epsilon_{it}$$

$$G_{it} = \begin{cases} 1 & \text{if } \Delta ExRate_{it-1} \geq 0 \\ 0 & \text{if } \Delta ExRate_{it-1} < 0 \end{cases} \quad (4)$$

Here, G_{it} represents a binary variable that equals 1 for a currency depreciation and 0 for a currency appreciation. β_4^+ and β_4^- represent the corresponding coefficients.

Secondly, the case of size asymmetry is considered, whereby inflation differentials respond differently to large and small exchange rate fluctuations:

$$\pi_{it} = \phi_t + \beta_1 GDP_PG_{it} + \beta_2 Gap_{it} + \beta_3 Fisc_{it} + \beta_4^{large} I_{it} \Delta ExRate_{it-1} + \beta_4^{small} I_{it} \Delta ExRate_{it-1} + \delta P_{it-1} + \epsilon_{it}$$

$$I_{it} = \begin{cases} 1 & \text{if } \Delta ExRate_{it-1} \geq 5\% \\ 0 & \text{if } \Delta ExRate_{it-1} < 5\% \end{cases} \quad (5)$$

Here, I_{it} represents a binary variable that equals 1 for a shock greater than or equal to 5% (large shock), and 0 for a shock less than 5% (small shock). β_4^{large} and β_4^{small} are the corresponding coefficients, while all other variables remain as previously defined.

Inflation differentials might be more responsive to exchange rate depreciation than appreciation for two reasons. First, as per Peltzman (2000), domestic prices tend to rise quickly when input costs increase but fall slowly when input costs decrease. Therefore, given that exchange rate depreciation raises foreign input costs while exchange rate appreciation does the opposite, we can expect a stronger impact on domestic prices when the exchange rate depreciates than when it appreciates. Second, as per Coughlin & Pollard (2003), if exporting firms face capacity constraints in their distribution networks, then an exchange rate appreciation in the importing country might result in a lower pass-through to

¹⁰In the Keynesian model of income determination (Keynes 1936), disposable income raises the general price level by boosting private consumption and aggregate demand.

prices than a depreciation. This is because, by limiting potential sales, capacity constraints deter the lowering of import prices that usually occur due to the appreciation of the importing country's currency. On the other hand, capacity constraints have no effect on the exporting firm's decision to raise import prices as the importer's currency depreciates.

Furthermore, large exchange rate fluctuations might affect inflation differentials on a greater scale than small fluctuations. Coughlin & Pollard (2003) attribute this form of asymmetry to the fact that firms may absorb the effect of small changes in the exchange rate by keeping prices constant.¹¹ Meanwhile, firms may pass on the effects of large exchange rate changes by adjusting prices to gain or preserve markup on costs.

5 Results

To preliminarily assess why countries have achieved varying levels of price stability, scatter plots with kernel fit are presented to highlight possible correlations between inflation and the potential macroeconomic determinants. As revealed in Figure 4, some of the results corroborate prior expectations. The kernel fits for GDP per capita growth and the exchange rate are upward sloping, suggesting a positive relationship with inflation. On the other hand, the kernel fits for the output gap, price level, and fiscal deficit vary in direction and, therefore, contradict prior expectations of a strong negative or positive relationship.

Next, the two-step system GMM (Blundell & Bond 1998) is employed to estimate the baseline model and its extensions in pooled and dynamic (autoregressive) form. This estimator is appropriate for handling potential endogeneity bias due to reverse causality from the regressors to the dependent variable. It also provides consistent estimates when the number of cross-sections (N) exceeds the number of timely observations (T), as obtainable in this study's dataset.

The difference GMM by Arellano & Bover (1995) is an alternative to the system GMM. However, Roodman (2009) shows that it can be downwardly biased. According to Roodman (2009), a simple way of detecting the bias is to make comparisons using results from an ordinary least squares (OLS) model and a fixed effects model. More precisely, if there is a downward bias, the coefficient of the lagged dependent variable in the difference GMM should be less than or close to the fixed effects counterpart. But if there is no downward bias, the coefficient should lie in-between its counterparts in the OLS and fixed effects models. Based on the results in Table B.3 (Appendix B), the coefficient is much less than its counterpart in the fixed effects model. Therefore, the difference GMM seems to be downwardly biased and the system GMM remains the preferred option.

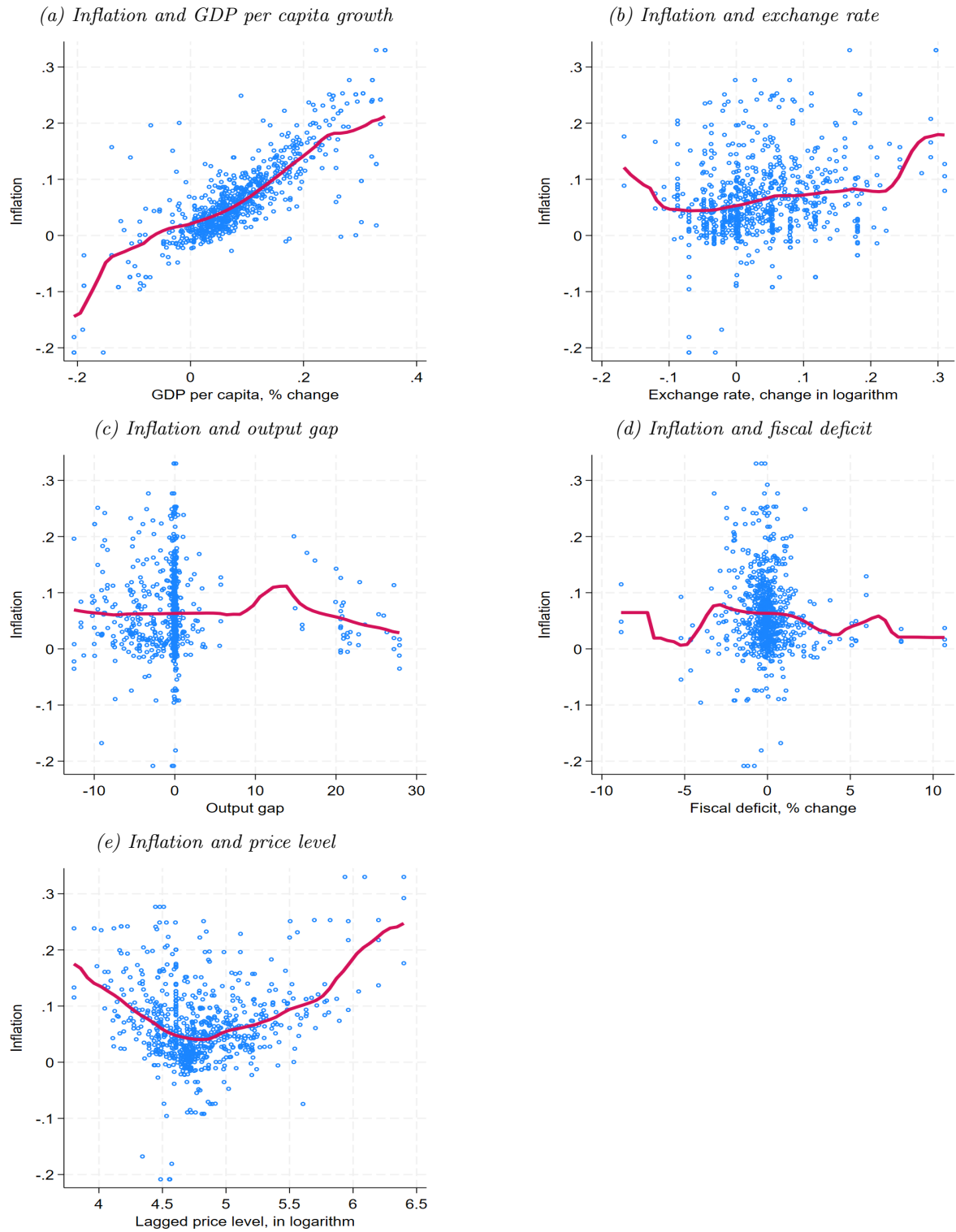
Results based on the system GMM are presented in Table 2.¹² Here, the GMM models are presented in pooled and dynamic form, but the pooled GMM is more appropriate for the panel regression analysis because inflation differentials are not persistent.¹³ In the baseline pooled GMM model (column 1), the

¹¹Firms may absorb small exchange rate shocks to mitigate the costs of changing new prices.

¹²The correlation matrices in Table B.1 and Table B.2 show that the explanatory variables are weakly correlated. Therefore, the regression models do not suffer from multi-collinearity.

¹³Here, persistence is measured by the statistical significance of the lagged dependent variable.

Figure 4: Inflation and potential determinants



Notes: Scatter plots with kernel fits for the relationship between inflation and the potential macroeconomic determinants during the period 2006 - 2023. Inflation and fiscal deficit as a percentage of GDP in percentage points. Outliers winsorized at the 5% level to aid illustration.

output gap is the only variable found to be insignificant. Its insignificance implies that business cycles or cyclical fluctuations do not play a role in determining inflation differentials. Conversely, GDP per capita growth positively influences the differentials, confirming prior speculations that higher GDP per capita growth leads to increased disposable income and aggregate demand, ultimately driving price levels higher.

Table 2: Determinants of inflation differentials

	Pooled GMM			Dynamic GMM		
	(1) (Sym.)	(2) (Sign asym.)	(3) (Size asym.)	(4) (Sym.)	(5) (Sign asym.)	(6) (Size asym.)
GDP per capita growth	0.4506** (2.5700)	0.4582** (2.4700)	0.4489** (2.3500)	0.4901** (2.1900)	0.6479*** (3.1700)	0.6707** (2.2400)
Output gap	0.0002 (0.4000)	0.0002 (0.4000)	0.0002 (0.4400)	0.0039 (1.3200)	0.0020 (1.3400)	0.0019 (0.8000)
Δ Fiscal deficit	0.0003*** (2.6200)	0.0004*** (2.2500)	0.0004*** (2.6900)	0.0138** (2.4400)	0.0074 (1.0300)	0.0072 (0.7000)
Price level	0.0815* (1.9400)	0.0723** (1.9700)	0.0763* (1.9300)	0.1205** (2.5700)	0.0892* (1.9600)	0.0737 (1.0800)
Δ Exchange rate	0.1554 (4.0900)***			0.0759 (0.5000)		
Δ Exchange rate: depreciation		0.1735*** (5.0000)			-0.1200 (-0.7600)	
Δ Exchange rate: appreciation		0.0435 (0.5400)			0.4427 (1.3400)	
Δ Exchange rate: large shock			0.1525*** (4.6900)			-0.1119 (-0.4700)
Δ Exchange rate: small shock			0.1254 (1.2600)			0.2899 (1.0000)
Inflation _{t-1} (persistence)				-0.0707 (-0.7000)	-0.0491 (-0.4900)	-0.0181 (-0.1500)
Constant	-0.4083* (-1.9500)	-0.3646** (-2.0200)	-0.3815* (-1.9600)	-0.5541*** (-2.6300)	-0.4039* (-1.8200)	-0.3288 (-1.0000)
Wald test	489.5100	702.9900	450.4600	2168.81	3878.6400	2927.5200
Wald p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AR(2)	0.5720	0.6410	0.5690	0.5670	0.4610	0.4760
Hansen test	14.8500	14.6800	15.4100	9.6900	11.0800	11.2000
Hansen p-value	0.1380	0.2590	0.2200	0.6430	0.6800	0.6700
Instruments/Groups	32/44	35/44	35/44	35/44	38/44	38/44
Observations	718	718	718	718	718	718

Notes: Results based on two-step system GMM with period fixed effects. Price level and change in exchange rate lagged by one year. Z-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The fiscal deficit, lagged price level, and exchange rate also have positive effects. In the case of the fiscal deficit, this suggests that government borrowing widens the differentials, whereas surplus revenue narrows them. Regarding the exchange rate, this implies that exchange rate depreciation increases the differentials, while exchange rate appreciation reduces them. As for the lagged price level, the findings suggest that price levels are diverging rather than converging, as previously illustrated in Figure 2.

The extended models in columns 2 and 3 confirm the existence of sign and size asymmetries in the

exchange rate pass-through, consistent with Coughlin & Pollard (2003). Concerning sign asymmetry, the pass-through to the differentials is more substantial during periods of currency depreciation. Concerning size asymmetry, the pass-through effect is stronger when the exchange rate experiences large shocks. Taken together, both findings imply that the pass-through effect is more substantial during episodes of large currency depreciation.

Lastly, the significant point estimates are interpreted as follows: a 1 percent increase in GDP per capita growth leads to an increase of about 0.45 percent in the differentials, while a 1 percent increase in the fiscal deficit leads to an increase of around 0.0003 percent. Regarding the exchange rate pass-through, the symmetric model suggests that, on average, a 1 percent depreciation (or appreciation) leads to an increase (or decrease) of around 0.16 in the differentials.

In summary, the regression results underscore the importance of growth, exchange rate fluctuations, convergence factors, and fiscal policy as explanatory variables. However, because there are no existing studies on the determinants of inflation differentials in the AEC, we cannot observe the extent to which these results contrast or confirm previous findings. We can only observe that they contrast studies such as Honohan & Lane (2003) suggesting a minor role for GDP per capita growth and a major role for cyclical fluctuations (the output gap) in other regional economic communities.

5.1 Robustness Checks

The study performs five robustness checks on the regression results, as shown in Tables 3 to 5. First, in Table 3, CPI inflation is used instead of GDP deflator inflation as the primary measure of the inflation rate. Here, results based on the CPI are qualitatively similar to those based on the GDP deflator because GDP per capita growth, the fiscal deficit, convergence factors (the lagged price level), and the exchange rate are still the main determinants.

Second, regional dummies are introduced to control for the potential effects of regional heterogeneity, since the AEC member states belong to different regional blocs. The regional blocs include the Economic Community of West African States (ECOWAS), the Southern African Development Community (SADC), the East African Community (EAC), the Economic Community of Central African States (ECCAS), and North Africa.¹⁴ As shown in Table 3, the regional dummy variables are statistically insignificant, suggesting that there is no systematic regional heterogeneity in the differentials.

In Table 4, three dummy variables are introduced for the global financial crisis, the COVID-19 pandemic period, and the Ukraine War to control for the potential impact of economic instability. The inclusion of these variables does not alter the results. However, each variable has a small positive and significant effect, indicating that periods of economic instability also lead to higher differentials.

Next, given that the AEC member states operate different monetary policy frameworks, dummies are introduced to control for the potential effects of policy regimes on the differentials. According to the IMF's classification (International Monetary Fund 2023), the four main policy frameworks include exchange rate anchoring, monetary aggregate targeting, inflation targeting, and frameworks with multiple mandates. The impact of exchange rate anchoring is directly measured by the exchange rate

¹⁴To avoid multicollinearity, the dummy for the ECCAS is excluded from the regressions.

Table 3: Robustness checks for baseline model

	Estimation with CPI inflation			Estimation with regional dummies		
	Sym.	Sign asym.	Size asym.	Sym.	Sign asym.	Size asym.
GDP per capita growth	0.4496*** (4.6400)	0.5367*** (7.0100)	0.5176*** (6.3000)	0.4472** (2.5200)	0.4562** (2.5100)	0.4468** (2.3300)
Output gap	0.0009 (0.9200)	0.0006 (0.8300)	0.0005 (0.5100)	0.0002 (0.3500)	0.0002 (0.3500)	0.0002 (0.4000)
ΔFiscal deficit	0.0061** (2.3300)	0.0044** (2.1300)	0.0049** (2.2300)	0.0003** (2.5300)	0.0003** (2.0700)	0.0004*** (2.6100)
Price level	0.1130*** (7.0900)	0.0931*** (7.4800)	0.1036*** (8.5400)	0.0780* (1.9500)	0.0686** (2.1000)	0.0725** (1.9700)
ΔExchange rate	0.3211*** (6.0700)			0.1559*** (4.1900)		
ΔExchange rate: depreciation		0.3389*** (4.9400)			0.1730*** (5.1400)	
ΔExchange rate: appreciation		0.0723 (0.6200)			0.0363 (0.4200)	
ΔExchange rate: large shock			0.2286*** (2.6400)			0.1522*** (4.8200)
ΔExchange rate: small shock			0.1588 (1.2200)			0.1201 (1.1800)
Constant	-0.5493*** (-6.8400)	-0.4536*** (-7.6200)	-0.4927*** (-7.8200)	-0.3880* (-1.9500)	-0.3441** (-2.1200)	-0.3610** (-1.9700)
ECOWAS				-0.0038 (-0.5100)	-0.0040 (-0.3900)	-0.0030 (-0.3200)
SADC				-0.0019 (-0.2200)	-0.0011 (-0.1000)	-0.0005 (-0.0500)
EAC				0.0054 (0.4800)	0.0085 (0.6300)	0.0074 (0.5300)
North				-0.0017 (-0.2600)	-0.0006 (-0.0800)	-0.0009 (-0.1200)
Wald test	913.9800	11484.1900	4904.3800	587.9200	1078.2600	795.3000
Wald p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AR(2)	0.4930	0.5620	0.6810	0.5760	0.6400	0.5710
Hansen test	21.4600	22.9900	23.5200	15.0800	14.6200	15.3400
Hansen p-value	0.1230	0.1910	0.1710	0.1290	0.2630	0.2230
Instruments/groups	37/44	41/44	41/44	36/44	39/44	39/44
Observations	718	718	718	718	718	718

Notes: Results based on two-step system GMM with period fixed effects. Price level and change in exchange rate lagged by one year. Z-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Robustness checks for baseline model (cont'd.)

	Estimation with crises dummies			Estimation with regime dummies		
	Sym.	Sign asym.	Size asym.	Sym.	Sign asym.	Size asym.
GDP per capita growth	0.4506** (2.5700)	0.4582** (2.4700)	0.4489** (2.3500)	0.4263** (2.2700)	0.4356** (2.3400)	0.4293** (2.2400)
Output gap	0.0002 (0.4000)	0.0002 (0.4000)	0.0002 (0.4400)	0.0002 (0.4300)	0.0002 (0.3800)	0.0002 (0.4800)
Δ Fiscal deficit	0.0003*** (2.6200)	0.0004** (2.2500)	0.0004*** (2.6900)	0.0003** (2.1700)	0.0003** (2.0700)	0.0003** (2.3000)
Price level	0.0815* (1.9400)	0.0723** (1.9700)	0.0763* (1.9300)	0.0692* (1.7000)	0.0539** (2.0400)	0.0571* (1.7500)
Δ Exchange rate	0.1554*** (4.0900)			0.1531*** (4.1800)		
Δ Exchange rate: depreciation		0.1735*** (5.0000)			0.1784*** (5.2100)	
Δ Exchange rate: appreciation		0.0434 (0.5400)			-0.0153 (-0.1400)	
Δ Exchange rate: large shock			0.1525*** (4.6900)			0.1575*** (4.9500)
Δ Exchange rate: small shock			0.1254 (1.2600)			0.0613 (0.5400)
Global financial crisis	0.0681** (2.2700)	0.0603* (1.8500)	0.0636* (1.9200)			
COVID-19 crisis	0.0472*** (2.8500)	0.0467** (2.4000)	0.0485** (2.4800)			
Ukraine war	0.0235** (2.1600)	0.0214* (1.6800)	0.0234* (1.9200)			
Monetary aggregate targeting				0.0094 (0.8600)	0.0122 (0.9700)	0.0124 (1.0100)
Inflation targeting				0.0078 (0.4600)	0.0127 (0.5600)	0.0144 (0.7000)
Other policy framework				-0.0016 (-0.1800)	0.0009 (0.1000)	0.0012 (0.1200)
Constant	-0.4317** (-2.0500)	-0.3860** (-2.0200)	-0.4049** (-2.0000)	-0.3435* (-1.7000)	-0.2712* (-2.0600)	-0.2843* (-1.7500)
Wald test	489.5100	702.9900	450.4600	549.7500	1119.65	604.7700
Wald p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AR(2)	0.5720	0.6410	0.5690	0.5870	0.7040	0.6130
Hansen test	14.8500	14.6800	15.4100	15.5400	14.6400	15.3400
Hansen p-value	0.1380	0.2590	0.2200	0.1140	0.2610	0.2230
Instruments/groups	32/44	35/44	35/44	35/44	38/44	38/44
Observations	718	718	718	718	718	718

Notes: Results based on two-step system GMM with period fixed effects. Price level and change in exchange rate lagged by one year. Z-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Robustness checks for size asymmetry

	3% threshold	5% threshold	7% threshold	9% threshold
	(1)	(2)	(3)	(4)
GDP per capita growth	0.4580** (2.3600)	0.4489** (2.3500)	0.4570*** (2.6800)	0.4553*** (2.7200)
Output gap	0.0002 (0.4700)	0.0002 (0.4400)	0.0002 (0.3700)	0.0002 (0.3900)
Δ Fiscal deficit	0.0004** (2.3300)	0.0004*** (2.6900)	0.0003** (2.4000)	0.0003** (2.5800)
Price level	0.0748* (1.8000)	0.0763* (1.9300)	0.0788** (2.1400)	0.0788** (2.3200)
Δ Ex. rate ^{large}	0.1582*** (5.0300)	0.1525*** (4.6900)	0.1672*** (4.5400)	0.1619*** (4.1800)
Δ Ex. rate ^{small}	0.0905 (0.8800)	0.1254 (1.2600)	0.1144** (2.0000)	0.1246** (2.0400)
Constant	-0.3745* (-1.8300)	-0.3815* (-1.9600)	-0.3958** (-2.1700)	-0.3948** (-2.3600)
Wald test	540.8200	450.4600	549.3900	735.4000
Wald p-value	0.0000	0.0000	0.0000	0.0000
AR(2)	0.5780	0.5690	0.6130	0.5890
Hansen test	14.7400	15.4100	14.8200	14.7100
Hansen p-value	0.2560	0.2200	0.2520	0.2570
Instruments/groups	35/44	35/44	35/44	35/44
Observations	718	718	718	718

Notes: Results based on two-step system GMM with period fixed effects. Price level and change in exchange rate lagged by one year. Z-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

variable. Therefore, the dummy variables included represent the other three frameworks. These dummy variables are statistically insignificant, suggesting that differences in the three policy frameworks do not systematically influence the differentials.

Finally, in Table 5, the robustness of using 5% as a threshold to differentiate large from small exchange rate shocks in the asymmetric models is validated. This is achieved by re-estimating the asymmetric models using lower and higher threshold values: 3%, 7%, and 9%. When 3% is used as the threshold value, as depicted in column 1, substantial asymmetry still exists in terms of larger shocks having a more significant impact than smaller shocks. However, when 7% or 9% is used as the threshold value, as depicted in columns 3 and 4, both large and small shocks have significant effects, and the substantial asymmetry vanishes. This suggests that a threshold value around 5% is optimal in differentiating between large and small exchange rate shocks in the asymmetric models.

6 Conclusion

This paper investigates the determinants of inflation differentials in the African Economic Community (AEC). It utilizes the system GMM estimator (Blundell & Bond 1998) and panel data covering 2006-2023 for empirical analyses. The model employed considers a country's exchange rate, GDP per capita growth, fiscal deficit, output gap, and price divergence (or convergence) as potential determinants of its

inflation differentials. Alternative specifications also consider the persistence of these differentials and various measures of economic instability. The results reveal that country-specific differentials positively depend on exchange rate depreciation, GDP per capita growth, price divergence, and the fiscal deficit but not on the output gap. Furthermore, the differentials seem to be transitory rather than persistent and more pronounced during periods of economic instability.

Most of these results contradict previous studies on other regions, thus suggesting that the dynamics of inflation differentials in the AEC might be unique. The first dissimilarity concerns the output gap's role and the persistence of differentials. While this study finds that the output gap and persistence are not relevant for differentials in the AEC, previous euro area studies, including Hofmann & Remsperger (2005), Zdarek & Aldasoro (2009), and Coutinho & Licchetta (2023) identify these factors as key determinants. The second dissimilarity concerns the role of GDP per capita growth. While this study finds that GDP per capita growth positively influences the differentials, Honohan & Lane (2003) show that this variable and productivity shocks are statistically insignificant. The last dissimilarity concerns the convergence of prices. While this study finds that prices are divergent, previous studies, including Mohaddes & Williams (2011) and Carrasco & Ferreiro (2014), find evidence of price convergence in other developing regions.

Nonetheless, it is worth mentioning that the results agree with the findings of previous studies in a few areas. For instance, the results agree with Micallef & Cyrus (2013) in showing that the fiscal deficit matters for differentials. Furthermore, the results agree with Stylianou (2023) in showing that the exchange rate also matters.

To conclude, large inflation differentials might be problematic for the AEC due to the welfare costs in high-inflation countries and the constraints on monetary integration in existing and prospective monetary unions. This study, therefore, suggests that policies aimed at exchange rate stabilization, fiscal discipline, and fiscal coordination can help achieve narrow differentials for the benefit of member states.

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Appendices

A Data

Table A.1: Variables

Variable	Description	Source
Inflation	Annual growth rate of the gross domestic product (GDP) implicit deflator	WB
Inflation (CPI)	Annual growth rate of consumer prices	WB
GDP per capita growth	Annual growth rate of GDP per capita (GDP in local currency divided by midyear population)	WB
Output gap	Cyclical component of the logarithm of real GDP (in local currency) obtained using the HP filter (lambda=1600)	
Fiscal deficit/surplus	Government spending minus revenue as a percentage of GDP	IFS
Price level	Logarithm of consumer price index	WB
Exchange rate	Logarithm of nominal exchange rate	IFS
ECOWAS	Dummy, =1 for member states of the ECOWAS	ECOWAS
SADC	Dummy, =1 for member states of the SADC	SADC
EAC	Dummy, =1 for member states of the EAC	EAC
North Africa	Dummy, =1 for countries in North Africa	AU
Global financial crisis	Dummy, =1 for period covering the global financial crisis, 2008 - 2012	
COVID-19 crisis	Dummy, =1 for period covering the COVID-19 crisis, 2019 - 2022	
Ukraine war	Dummy, =1 for period covering the Ukraine War, 2022 - 2023 (last year in the sample)	
Monetary targeting	Dummy, =1 for countries using a monetary aggregate targeting framework	IMF
Inflation targeting	Dummy, =1 for countries using an inflation targeting framework	IMF
Other policy framework	Dummy, =1 for countries targeting multiple indicators for monetary policy	IMF

Notes: WB denotes The World Bank's Open Data database; IMF denotes The International Monetary Fund; IFS denotes The International Monetary Fund's International Financial Statistics database; ECOWAS denotes Economic Community of West African States; SADC denotes Southern African Development Community; EAC denotes East African Community; AU denotes African Union.

Table A.2: Monetary Policy Frameworks

Exchange rate anchor	Monetary aggregate target	Inflation targeting framework	Other
Benin	Algeria	Ghana	Malawi
Botswana	Angola	Kenya	Mauritania
Burkina Faso	Burundi	South Africa	Mauritius
Cameroon	Congo, DR	Uganda	Mozambique
Central African Republic	Ethiopia		Tunisia
Chad	Gambia		Zambia
Comoros	Guinea		
Congo	Liberia		
Cote d'Ivoire	Madagascar		
Djibouti	Nigeria		
Equatorial Guinea	Rwanda		
Gabon	Sierra Leone		
Guinea-Bissau	Tanzania		
Libya			
Mali			
Morocco			
Namibia			
Niger			
Sao Tome and Principe			
Senegal			
Togo			

Notes: Information on monetary policy regimes can be found in the IMF's annual report on exchange arrangements and restrictions. Ghana, Kenya, and Uganda migrated to inflation targeting in 2009, 2013, and 2011, respectively. South Africa adopted inflation targeting in 2000.

B Supplementary Regressions and Diagnostics

Table B.1: Pairwise correlation coefficients

	Infl. _{<i>t</i>-1}	GDP per cap.	Output gap	ΔFiscal deficit	Price level	ΔExchange rate
Inflation _{<i>t</i>-1}	1.0000					
GDP per cap. growth	0.3746	1.0000				
Output gap	-0.0474	-0.0219	1.0000			
ΔFiscal deficit	-0.0301	-0.0072	-0.0134	1.0000		
Price level	0.1108	0.0892	-0.1621	-0.0720	1.0000	
ΔExchange rate	0.1405	0.1571	0.0107	-0.0166	0.2688	1.0000
	Infl. _{<i>t</i>-1}	GDP per cap.	Output gap	ΔFiscal deficit	Price level	ΔExchange rate
ECOWAS	-0.0493	0.0045	-0.0071	0.0214	-0.0736	-0.0180
SADC	0.0970	0.0796	-0.0168	-0.0314	0.1026	0.1313
EAC	0.0806	0.0931	-0.0061	0.0334	0.0365	0.0025
North Africa	-0.0192	-0.0421	-0.0254	0.0159	-0.0112	-0.0030
Global financial crisis	0.1206	0.1470	0.0989	0.0087	-0.4856	-0.1619
COVID-19 crisis	-0.0600	-0.0248	-0.1554	-0.0295	0.4399	-0.0211
Ukraine war	0.0969	0.0587	-0.0914	-0.0893	0.3702	0.0547
Monetary targeting	0.2344	0.2275	-0.0341	0.0163	0.1332	0.1286
Inflation targeting	0.0645	0.0658	0.0071	0.0112	0.1735	0.0899
Other policy	0.0206	0.0179	-0.0676	0.0571	0.0464	0.0758

Notes: The table reports pairwise correlation coefficients for the explanatory variables.

Table B.2: Pairwise correlation coefficients (cont'd.)

	ECOWAS	SADC	EAC	NA	GFC	COVID	War	MAT	IT	Other
ECOWAS	1.0000									
SADC	-0.3837	1.0000								
EAC	-0.2614	0.0284	1.0000							
North Africa	-0.2435	-0.2060	-0.1403	1.0000						
Global financial crisis	0.0089	0.0075	0.0107	-0.0041	1.0000					
COVID-19 crisis	-0.0116	-0.0154	-0.0181	0.0065	-0.3545	1.0000				
Ukraine war	-0.0574	-0.0203	-0.0213	-0.0063	-0.2236	0.2312	1.0000			
Monetary targeting	0.0740	0.0480	0.3740	-0.0767	0.0494	-0.0442	-0.0508	1.0000		
Inflation targeting	-0.0277	0.0395	0.2567	-0.1052	-0.0694	0.0450	0.0396	-0.1914	1.0000	
Other policy	-0.2661	0.3905	-0.1534	0.2649	0.0025	-0.0047	-0.0251	-0.2601	-0.1149	1.0000

Notes: The table reports pairwise correlation coefficients for the explanatory variables.

Table B.3: Alternative estimators for dynamic panel data models in Table 2

	OLS			Fixed Effects			2 step difference GMM		
	Sym.	Sign asym.	Size asym.	Sym.	Sign asym.	Size asym.	Sym.	Sign asym.	Size asym.
Inflation _{t-1}	-0.1193 (-1.1900)	-0.1196 (-1.1900)	-0.1204 (-1.2000)	-0.2075*** (-6.2800)	-0.2075*** (-6.2700)	-0.2075*** (-6.2700)	-0.4567*** (-2.7300)	-0.4509*** (-2.7200)	-0.4574*** (-2.7800)
GDP per cap.	0.4235*** (4.4800)	0.4233*** (4.4800)	0.4231*** (4.4900)	0.3995*** (15.4300)	0.3995*** (15.4100)	0.4001*** (15.4200)	0.3378* (1.9500)	0.3479* (1.9800)	0.3493** (2.0600)
Output gap	0.0003 (0.6400)	0.0003 (0.6400)	0.0003 (0.6700)	0.0000 (0.0300)	0.0000 (0.0300)	0.0000 (0.0300)	-0.0008 (-1.2100)	-0.0007 (-1.2500)	-0.0007 (-1.2600)
ΔFiscal deficit	-0.0001 (-0.3500)	-0.0001 (-0.3400)	-0.0001 (-0.3500)	-0.0000 (-0.1100)	-0.0000 (-0.1100)	-0.0000 (-0.1100)	0.0002 (1.0800)	0.0002 (0.9700)	0.0002 (0.9200)
Price level	0.0633*** (3.1600)	0.0640*** (3.1100)	0.0645*** (3.1200)	0.0188 (1.3500)	0.0188 (1.3300)	0.0199 (1.4100)	-0.0695 (-0.5700)	-0.0573 (-0.5100)	-0.0586 (-0.5700)
ΔEx. rate	0.1563*** (2.7900)			0.1184*** (3.7200)			0.0432 (0.5400)		
ΔEx. rate ⁺		0.1492*** (2.3400)			0.1182*** (3.1800)			0.0280 (0.2700)	
ΔEx. rate ⁻		0.1948*** (2.0700)			0.1194 (1.0900)			0.1507 (1.1600)	
ΔEx. rate ^{large}			0.1418** (2.3900)			0.1115*** (3.1800)			0.0295 (0.3100)
ΔEx. rate ^{small}			0.2413** (2.5600)			0.1606* (1.6800)			0.1494 (1.2500)
Constant	-0.2968*** (-3.0300)	-0.2995*** (-3.0000)	-0.3006*** (-3.0100)	-0.0478 (-0.6500)	-0.0479 (-0.6400)	-0.0524 (-0.7000)			
R-squared	0.4422	0.4423	0.4430	0.4112	0.4112	0.4125			
F test	23.5800	23.6500	23.9800	17.1300	16.3600	16.3800	59.9000	64.3300	64.3400
F p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
AR(2)							0.1870	0.1980	0.1920
Hansen test							15.0600	16.2200	16.2100
Hansen p-value							0.0200	0.0230	0.0230
Instruments/groups	-/44	-/44	-/44	-/44	-/44	-/44	28/44	30/44	30/44
Observations	718	718	718	718	718	718	674	674	674

Notes: Period fixed effects included. Price level and change in exchange rate lagged by one year. Z-statistics in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

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