The Symmetry of Demand and Supply Shocks in Monetary Unions

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This study has been motivated by the numerous proposals for greater monetary and economic integration in Africa. We investigate the correlation of shocks between the exiting members of the West African Economic and Monetary Union and potential entrants in the region. In Southern Africa, we examine the pair wise correlations using the hub and spoke framework with South Africa as the hub. We observe large demand shock asymmetry amongst the countries in the west than in the south, suggesting more economic homogeneity amongst the members of the South African Development Community. However, there seem to be more supply shock symmetry amongst the countries in West Africa than their counterparts in the south.

INTRODUCTION

Recently, several initiatives towards greater financial and monetary integration have been proposed on the African continent. For example, the South African Development Community (SADC) plans to establish a common currency by 2018. In the East of Sub-Saharan Africa (SSA), the East African Community (EAC) is considering a monetary union, while in the west, the West African Economic and Monetary Union (WAEMU) plans to expand its membership to include all the members of the West African Monetary Zone (WAMZ). On a larger scale, the African Union has proposed to implement a single monetary zone (and possible single currency) for all of SSA and other African countries by 2028.

A central theme in most of the empirical literature on financial integration is whether the cost of integration outweighs the benefits. The origins of this debate can be traced back to Mundell's (1961) seminal paper on optimum currency areas. Mundell writes that the benefits of financial integration are realized more amongst countries with similar terms of trade shocks than amongst those with asymmetric shocks. The presence of asymmetric shocks, he argues, makes financial integration harder and more costly to manage because the respective countries may need different monetary policies to respond effectively to their individual shocks. In addition, Houssa and Leuven, (2004) argue that in the SSA, one of the concerns with the proposed expansion of the WAEMU to include WAMZ countries hinges on the fact that the high inflationary countries (WAMZ) may lose competitiveness in a monetary union with the lower inflationary countries (WAEMU). This implies that a similarity in terms of trade shocks is a

necessary pre-condition for monetary integration because it prevents the need for individualized adjustment tools among the countries and allows for the implementation of a common monetary policy.

Apart from the lack of symmetry in terms of trade shocks, others have examined in general the welfare benefits and costs of belonging to a monetary union. One such study by Fieldings and Shields (2001) on the CFA zone suggests that the welfare benefits of low inflation, lower exchange rate variability, lower transaction costs and greater macroeconomic integration enjoyed by existing monetary unions certainly surpasses the most recognized cost which is the loss of exchange rate flexibility as an adjustment tool. Other proponents of monetary unions have argued that the loss of exchange rate flexibility should not impede adjustment to macroeconomic shocks, since there exist sufficient mitigation instruments to achieve the same objective (Devarajan and De Melo, 1987). There is also ample evidence suggesting that some of the welfare losses experienced by the exiting monetary unions in SSA stem from the fact that monetary unions are formed in the region without regard to the economic profiles of the respective countries. Fielding and Shields (2001) argue that the nations make commitments to join single currency and monetary unions with countries with whom they have different economic characteristics. Similarly, Etta-Nkwelle and Jeong (2009) add that unlike the European Monetary Union, where members were required to satisfy some pre-requisite conditions prior to admission, in Africa formation was exogenous and without any convergence criteria. As a result, these countries frequently subject themselves to regional macroeconomic policy directives which may not necessarily be optimal to their specific economy. In an effort to address some of these concerns, the WAEMU, WAMZ and SADC established, in 1994, 2001 and 2002 respectively, a set of convergence guidelines to reduce the divergence in macroeconomic characteristics between the members. The guidelines emphasized both monetary and fiscal convergence amongst the members, but, as reported by Ghosh, Gulde and Wolf (2008), progress has been slow and inconsistent, and the WAMZ has pushed its targeted date for meeting their criteria three times to 2015.

Furthermore, over the last decade, as integration in Europe has progressed, several authors have examined the macroeconomic characteristics and symmetry of shocks amongst African nations to determine the feasibility of monetary integration in the region (Bayoumi and Ostry, 1998; Guillaume and Stasavage, 2000; Fielding and Shields, 2003; Houssa and Leuven, 2004; and Houssa, 2008). The study by Bayoumi and Ostry (1998) on Sub-Saharan African countries using an AR (2) model of output disturbances found no correlations amongst the members. In contrast, the studies by Fielding and Shields (2003) and Houssa and Leuven (2004) on the CFA zone members found negative output shock correlations amongst the members. The authors conclude that the asymmetry of supply shocks amongst the members in the region reflects the lack of uniformity of macroeconomic policies and the diversity in commodity specialization which exist in the region. The conclusion drawn by these studies is that the cost of monetary unions amongst the members in the region may be high, implying that these countries are poor candidates for monetary union at this time (Bayoumi and Eichengreen, 1994).

Although a body of evidence exists indicating that the cost of monetary union in Africa may outweigh the benefits, Guillaume and Stasavage (2000) suggest that monetary integration amongst the nations in SSA is a necessary mechanism through which the commitment to price stability and financial discipline can be achieved. Therefore, in this paper, we are mindful of the commitments that these nations have made toward macroeconomic convergence, and we seek to investigate if these efforts have reduced the degree of asymmetric shocks between the memberships. In other words, this paper updates existing evidence on the feasibility of monetary integration in SSA by examining the correlation of demand and supply shocks between members of existing monetary unions and non-monetary union countries in Sub-Saharan Africa. Specifically, in the south of Africa, we expand the Common Monetary Area (CMA) and analyze the formation of a monetary union for the 14 members of the SADC. Likewise, in the west, the proposed expansion of the WAEMU to include five (WAMZ) accession members of ECOWAS is also analyzed. We do this to assess the degree of symmetry of shocks and to determine if the proposed expansion of the existing monetary unions to include other SSA countries and possible formation of a single currency zone for the region is feasible.

Like previous studies we employ a structural vector auto-regression (SVAR) model of output growth and inflation to recover supply and demand shocks. Unlike previous studies we use the hub and spoke framework in analyzing the SADC with South Africa (the largest economy in the SADC) as the hub on which the correlation of the shocks of the other countries are measured. We feel that this approach is justified by the virtue of South Africa's economic strength. But in the west of Africa, we compared the correlations of demand and supply shocks of the proposed accession countries (WAMZ) to that of the existing WAEMU nations. We see this update as necessary because of the dynamic nature of macro-economic performance on the continent. Therefore, the results of this study may provide additional evidence on the readiness of the SSA countries to form a monetary union and or whether there is a need for mandatory fulfillment of pre-conditions before accession into the proposed monetary zone.

The rest of the paper is organized as follows: Section 2 presents the analytical framework; Section 3 discusses the data; Section 4 presents the results; section 5 concludes with a summary of the main findings.

ANALYTICAL FRAMEWORK

Several of the existing studies that have examined the correlation of demand and supply shocks amongst groups of countries as a precondition for monetary integration have employed the structural vector autoregression procedure developed by Blanchard and Quah's (1989). This method uses a two variable VAR model of prices and output to identify demand and supply shocks with the restriction that only supply shocks have a permanent effect on output since demand shocks are transitory. Albeit, the fact that this procedure has been widely used in literature, it has its critics, among them: Bayoumi and Eichengreen, (1992); Kawai and Okumura, (1996); Faust and Leeper, (1997); Cooley and Dwyer, (1998); Demertzis, Hallett and Rummel (2000); and Gottschalk, (2001) and Houssa (2008) to name a few. Demertzis, Hallett and Rummel (2000) are concerned that this model does not necessarily identify purely stochastic shocks because estimated demand shocks tend to include the effect of macroeconomic policies, but estimated supply shocks are less likely to include the impact of the implemented policies (Zhang, McAleer and Sata, 2004). Houssa (2008) on the other hand is concerned about the large number of restrictions needed to recover the shocks. He adds that the number of parameters estimated with VAR models have a tendency to grow with the square of the number of variables, which may lower the degrees of freedom of the estimation.

Despite its limitations, the structural vector autoregression procedure is still widely used in the literature with slight modifications and/or extensions. In this paper, we follow Fidrmuc and Korhonen's (2003) version of the Blanchard and Quah (1989) procedure which uses an infinite framework to decompose output into its temporary and permanent components. The infinite framework overcomes the lack of uniqueness that is often used to criticize the univariate procedure of other research (such as that by Beveridge and Nelson, 1991). Like in Bayoumi and Eichengreen (1994a), we make the following assumptions: there is another variable that is affected by the same set of shocks as income; demand shocks increase the price level, while supply shocks decrease it, and output and prices are stationary. Therefore, the two variables VAR with output and inflation can be specified as an infinite moving average representation of demand and supply shocks:

$$Y_t = A_0\xi_t + A_0\xi_{t-1} + A_0\xi_{t-2} + A_0\xi_{t-3} + \ldots = \sum_{i=0}^{\infty} L^i A_i \xi_t \qquad (1.1)$$

In this model, Y_t is a vector of differences of logs of output and prices, ξ is a vector of demand and supply shock, A_i are the 2x2 matrices which transfer the effect of disturbances to the variables and L^i *i*s the lag operator. As mentioned above, it is also assumed that the shocks are uncorrelated, their variance is unity and demand shocks have no long run impact on output. A finite VAR specification of model (1.1) is estimated and used to identify demand and supply disturbances. Since the Y_t is stationary, the VAR specification can be inverted to obtain the moving average specification, where Ω is the vector of residuals from the two estimated equations:

$$Y_t = \Omega_t + \mathbf{B}_1\Omega_{t-1} + \mathbf{B}_2\Omega_{t-2} + \mathbf{B}_3\Omega_{t-3} + \ldots = \sum_{i=0}^{\infty} L^i \mathbf{B}_i \Omega_t \qquad (1.2)$$

According to Fidrmuc and Korhonen (2003), the variance-covariance matrix of the residuals is *VAR (Ω) = α.* From the two equations above (1.2), the relationship between the estimated residuals (Ω) and the original shocks (ξ): $\Omega_t = A_0\xi$ is derived. The matrices B_i are known from estimation but that of A_0 need to be known in order to calculate the underlying supply and demand shocks. Knowing that $A_i = B_i A_0$ and that $\sum_{i=0}^{\infty} A_i = \sum_{i=0}^{\infty} \mathrm{B}_i A_0$ helps with the identification of A_0. To recover the four elements of A_o, we need four restrictions. Two of the restrictions are normalizations defining the variance of the shocks ξ_{dt}. and ξ_{st}. The third restriction is the assumption that demand and supply shocks are orthogonal, which, with our notation, means that $A_0 A_0^* = \alpha$. The fourth restriction, as mentioned above, is that demand and supply shocks equal zero. These restrictions identify the elements of A_0 and allow for the extraction of demand and supply shocks from the residuals of the estimated VAR.

DATA

The sample used in this study consists of twenty-one Sub-Saharan African countries. Annual observations of real GDP and the consumer price index (CPI) for the period 1980 to 2007 were extracted from the World Bank's World Development Indicator (2009), International Monetary Fund's Regional Economic Outlook: Sub-Saharan Africa (2009), and the International Monetary Fund's International Financial Statistics (2008). The annual change in the CPI and the annual change in the real GDP have been used as proxies for inflation and growth rate respectively. All data have been converted to natural logarithms.

EMPIRICAL RESULTS

The feasibility of a monetary union is largely determined by the symmetry of shocks among the potential members. As a measure of symmetry, we use the correlation of demand and supply shocks. In particular, for the WAEMU, our focus is on the correlation of shocks between potential entrants (WAMZ) and existing members of the monetary union. For the SADC, we examine the pair wise correlation coefficients using the hub and spoke framework and measure the correlation of members, vis a vis South Africa. The results of the demand shock analysis of the WAEMU (Table 1) shows that the only significantly positive correlation is between Guinea Bissau and Gambia. These two coastal countries share some homogeneity in terms of export commodities, implying similarity in terms of trade shocks. That is, the countries are both exporters of agricultural products such as cashews and peanuts and have a relatively large fishing industry. In fact, in 2007, shelled cashew was the main export crop from both countries. Most of the other correlations are negative and insignificant. In a few cases, such as Benin and Ghana; and Guinea Bissau and Nigeria the correlations are negative and significant. This negative correlation has been found by other studies (Houssa, 2008). The authors suggest that this negative correlation implies a loss of competitiveness for the WAMZ if they join a monetary union with the low inflation countries in the WAEMU. For the countries that belong to the SADC, the only positive and significant demand correlations are between DR of Congo and Botswana, and Malawi and Botswana (Table 2). The existence of demand shock symmetry between DR of Congo and Botswana is not surprising, as both countries have diamond and other precious metals as their primary export commodity and thus may have similar responses to diamond price volatility. On the other hand, the symmetry of demand shocks between Malawi and Botswana is interesting given that the former exports mostly agricultural products such as tobacco, sugar and tea. Mauritius and Malawi, and Swaziland and DR of Congo, do show a significant but negative correlation implying diverse economic characteristics. Interestingly, we observe that more countries in the south exhibit positive but insignificant correlation

TABLE 1
DEMAND SHOCK CORRELATION OF WAEMU AND WAMZ MEMBERS

	Gambia	Ghana	Liberia	Nigeria	Sierra Leone
Benin	-0.03	-0.29***	-0.11	0.17	0.04
	(-0.27)	(-2.46)	(-0.63)	(1.03)	(0.21)
Burkina Faso	0.07	0.17	0.09	0.37	-0.15
	(0.44)	(0.10)	(0.53)	(0.22)	(-0.87)
Cote d'Ivoire	-0.16	-0.17	0.00	-0.01	-0.10
	(-0.97)	(-0.99)	(0.00)	(-0.04)	(-0.60)
Guinea Bissau	0.31*	-0.19	-0.16	-0.41***	-0.10
	(1.98)	(-1.15)	(-0.93)	(-2.61)	(-0.59)
Mali	-0.20	0.23	0.06	0.26	0.00
	(-1.26)	(1.37)	(0.34)	(1.59)	(0.00)
Niger	-0.05	-0.18	-0.08	-0.16	-0.26
	(-0.35)	(-1.06)	(0.49)	(-0.95)	(-1.59)
Togo	-0.24	-0.18	0.12	-0.19	0.16
	(-1.44)	(-1.06)	(0.73)	(-1.09)	(0.97)
Senegal	-0.10	-0.04	0.00	0.14	-0.15
	(-0.58)	(-0.22)	(0.00)	(0.83)	(-0.87)

Notes: The values of the "t" statistics are in parentheses. (, **, *** denotes significance at the 10 percent level, 5 percent level and at the 1 percent level respectively).*

TABLE 2
SADC: CORRELATION OF DEMAND SHOCKS

		Correlation	*t-Statistics*	*Probability*
Botswana	South Africa	0.164246	0.985073	0.3313
DR Congo	South Africa	-0.103324	-0.614564	0.5428
DR Congo	Botswana	0.286523	1.769274*	0.0856
Malawi	South Africa	0.238744	1.454488	0.1547
Malawi	Botswana	0.292304	1.808270*	0.0792
Mauritius	South Africa	0.020845	0.123345	0.9025
Mauritius	Botswana	0.041181	0.243838	0.8088
Mauritius	DR Congo	0.171018	1.026884	0.3115
Mauritius	Malawi	-0.371911	-2.370282	0.0234
Swaziland	South Africa	0.174335	1.047421	0.3021
Swaziland	Botswana	-0.155652	-0.932211	0.3576
Swaziland	DR Congo	-0.260836	-1.598457	0.1189
Swaziland	Mauritius	0.006142	0.036335	0.9712
Zambia	South Africa	0.011937	0.070625	0.9441
Zambia	Botswana	0.033199	0.196517	0.8453
Zambia	DR Congo	0.086212	0.511944	0.6119
Zambia	Malawi	0.022169	0.131185	0.8964
Zambia	Mauritius	-0.202858	-1.225608	0.2285
Zambia	Swaziland	-0.041750	-0.247211	0.8062

The only positive and significant correlations are Malawi and Botswana and DR Congo and Botswana

coefficients while in the west the coefficients are mostly negative and insignificant. Although demand shocks can be influenced by monetary and fiscal policy, we interpret the demand shock results on (Table 2) as suggesting that the SADC countries are relatively more economically homogenous and thus better suited to begin talks of monetary integration than their counterparts in the west. In an effort to support our interpretation, we examined some macroeconomic indicators in the respective regions and find little support for our suggestion. We find more divergence from the regional average (in terms of GDP growth, terms of trade shocks, inflation, current account balance and external debt) among the SADC countries than amongst the WAEMU and WAMZ nations. That is, we observe more uniformity in the economic characteristics of the WAEMU and WAMZ countries than amongst the countries in the SADC. The uniformity of the latter countries can be attributed to the fact that these countries have belonged to a customs union for many decades and thus have made some efforts towards the harmonization of trade policies albeit with little success.

On the supply side, we find more supply shock symmetry (twenty six positive relationships of which 57 percent are significant) amongst the WAEMU and WAMZ members. The results (Table 3) suggest positive and significant supply shock correlations exist for the following countries: Benin and Ghana; Benin and Nigeria; Burkina Faso and Liberia; Cote d'Ivoire and Gambia; Mali and Liberia; Niger and Ghana; Senegal and Gambia; and Togo and Sierra Leone. Benin and Gambia and Guinea Bissau and Liberia are the pairs of countries with negative and significant supply shocks.

TABLE 3
SUPPLY SHOCK CORRELATION OF WAEMU AND WAMZ MEMBERS

	Gambia	Ghana	Liberia	Nigeria	Sierra Leone
Benin	-0.44***	0.31*	0.18	0.28	-0.11
	(-2.82)	(1.93)	(1.10)	(1.64)	(-0.66)
Burkina Faso	-0.03	-0.08	0.26	0.24	-0.00
	(-0.18)	(-0.47)	(1.61)	(1.43)	(-0.04)
Cote d'Ivoire	0.30*	0.03	-0.00	0.04	-0.10
	(1.91)	(0.20)	(-0.02)	(0.25)	(-0.57)
Guinea Bissau	0.14	0.13	-0.28***	-0.03	0.19
	(0.84)	(0.74)	(-2.40)	(-0.20)	(1.14)
Mali	0.24	-0.20	0.28*	0.08	0.02
	(1.46)	(-1.19)	(1.76)	(0.47)	(0.15)
Niger	0.02	0.32*	0.09	0.09	0.05
	(0.11)	(1.97)	(0.53)	(0.51)	(0.27)
Togo	-0.18	0.23	-0.06	0.18	0.50***
	(-1.1)	(1.34)	(-0.38)	(1.06)	(3.33)
Senegal	0.37***	0.03	0.05	-0.19	-0.01
	(2.33)	(0.19)	(0.28)	(1.11)	(-0.04)

Notes: The values of the "t" statistics are in parentheses. (, **, *** denotes significance at the 10 percent level, 5 percent level and at the 1 percent level respectively)*

These results are contrary to the asymmetric supply shock observed earlier by Houssa (2008) between WAEMU and WAMZ members. Our results suggest that based on recent data the WAMZ has made some progress in terms of macro-economic policy harmonization with at least one WAEMU country and thus a monetary union may now be feasible. For the SADC (Table 4) we observe a significant positive pair wise correlation among: Zambia and South Africa; Mauritius and Zambia; DR Congo and South Africa and Madagascar and Mauritius. In addition, there is a significant negative correlation between the supply shocks of Botswana and Mauritius.

TABLE 4
SADC: CORRELATION OF SUPPLY SHOCKS

		Correlation	*t-Statistics*	*Probability*
Swaziland	South Africa	0.151324	0.905675	0.3713
Zambia	South Africa	0.349018*	2.203374	0.0342
Zambia	Swaziland	-0.161059	-0.965443	0.3409
Mauritius	South Africa	0.251851	1.539595	0.1327
Mauritius	Swaziland	-0.221924	-1.346497	0.1868
Mauritius	Zambia	0.440883*	2.905971	0.0063
Malawi	South Africa	0.031565	0.186832	0.8529
Malawi	Swaziland	-0.011576	-0.068490	0.9458
Malawi	Zambia	0.112287	0.668525	0.5082
Malawi	Mauritius	0.180027	1.082744	0.2863
Madagascar	South Africa	0.069329	0.411147	0.6835
Madagascar	Swaziland	0.163600	0.981090	0.3333
Madagascar	Zambia	0.065922	0.390853	0.6983
Madagascar	Mauritius	0.328714*	2.059123	0.0470
Madagascar	Malawi	0.247338	1.510195	0.1400
DR Congo	South Africa	0.332751	2.087541	0.0442
DR Congo	Swaziland	0.073743	0.437459	0.6645
DR Congo	Zambia	-0.209900	-1.270080	0.2124
DR Congo	Mauritius	0.127809	0.762380	0.4509
DR Congo	Malawi	-0.254902	-1.559535	0.1279
DR Congo	Madagascar	0.047168	0.279361	0.7816
Botswana	South Africa	-0.137319	-0.820158	0.4177
Botswana	Swaziland	0.022484	0.133054	0.8949
Botswana	Zambia	-0.025130	-0.148717	0.8826
Botswana	Mauritius	-0.315859	-1.969471	0.0569
Botswana	Malawi	0.113105	0.673461	0.5051
Botswana	Madagascar	-0.112139	-0.667636	0.5087
Botswana	DR Congo	0.026130	0.154641	0.8780

**Positive and significant correlations are: Zambia and South Africa; Mauritius and Zambia; and Madagascar and Mauritius and DR Congo and South Africa.*

Another aspect of symmetry relates to the size and the speed of adjustment to the shocks (Table 5). The impulse response functions are generated from the structural VARs and these facilitated the recovery of the supply and demand shocks, under the assumption that demand disturbances have no long-run impact on output, while the supply disturbances have permanent effects on output. This assumption provides the basis for measuring the sizes of the disturbances. Following Bayoumi and Eichengreen (1994), we use the long-run output effect of supply shock, and also measure the demand shock as the accumulated long run effect of demand shocks on the price level. Meanwhile for both shocks, the speed of adjustment is measured as the cumulative response after 2 years as a share of the long run effect. We find that the average size of demand shock to the SADC is almost twice (.26) that of the WAEMU and WAMZ combined (.15), while the supply shocks to both regional groups is relatively low and uniform (.05 and .05 respectively). Similarly, an examination of the individual nations reveals that the demand shocks to the southern nations are higher than that to the western nations. In the south, we find shocks of .56 (Zambia) and 1.03 (DR of Congo), while in the west, the highest shock is .48 (Guinea Bissau). The high shock to DR of Congo is not surprising given the internal conflicts which plagued the nation in the

1980s and 1990s. Interestingly, although the SADC are more prone to demand shocks than their counterparts in the west, they also seem to respond to these shocks relatively faster. In contrast, the speed of adjustment to supply shocks of the nations in the west is relatively faster than that of the southern nations. Albeit, slight difference, we conclude that both regions seem to adjust fairly quickly to both demand and supply shocks.

TABLE 5
THE SIZE AND SPEED OF ADJUSTMENT OF SADC, WAEMU AND WAMZ MEMBERS

	Demand Shocks		**Supply Shocks**	
	Size	*Speed of Adjustment*	*Size*	*Speed of Adjustment*
SADC	**0.26**	**0.78**	**0.05**	**0.78**
Botswana	0.02	0.83	0.09	0.51
DR Congo	1.03	0.86	0.14	0.50
Madagascar	0.10	0.85	0.04	0.99
Malawi	0.18	0.84	0.04	0.98
Mauritius	0.07	0.92	0.03	0.90
South Africa	0.07	0.67	0.04	0.79
Swaziland	0.04	0.93	0.005	0.91
Zambia	0.56	0.36	0.05	0.69
WAEMU AND WAMZ	**0.15**	**0.80**	**0.05**	**0.88**
Benin	0.08	0.75	0.03	0.99
Burkina Faso	0.08	0.83	0.02	0.94
Cote d'Ivoire	0.11	0.85	0.08	0.56
Gambia	0.11	0.83	0.03	0.92
Ghana	0.16	0.96	0.06	0.92
Guinea Bissau	0.48	0.48	0.08	0.99
Mali	0.09	0.92	0.05	0.98
Nigeria	0.12	0.99	0.05	0.99
Senegal	0.02	0.95	0.03	0.95
Sierra Leone	0.41	0.44	0.13	0.54
Togo	0.01	0.84	0.05	0.99

CONCLUSION

Although our results suggest that demand and supply shocks in Sub-Saharan Africa are still largely asymmetric, some symmetry is beginning to emerge especially amongst the countries in the west. We find that large demand shock asymmetry still exists amongst the WAEMU and WAMZ countries. Only Guinea Bissau and Gambia are positively correlated. However, in the south, although the SADC countries also have low demand shock symmetry, more countries seem to exhibit a positive (but insignificant) correlation coefficient, suggesting the movement towards homogeneity. Positive and significant demand shock symmetry exists between DR of Congo and Botswana and Malawi and Botswana. Therefore, in terms of demand shock, this study suggests that the southern African countries are better ready to form a monetary union than their counterparts in the west.

Interestingly, on the supply side, we observe more supply shock symmetry amongst the WAEMU and WAMZ countries than their counterparts in the south (SADC). This finding is interesting and different

from previous studies such as that by Fielding and Shield (2001) which found more demand shock correlations among the countries in the west. This observed progress towards more symmetric supply shocks amongst the countries in the west is not surprising given that the WAEMU and WAMZ institutional arrangements have existed longer than that of the south and efforts have been made over the last decade towards macroeconomic convergence. What is surprising is that progress has been slow in all the groupings towards macroeconomic convergence as the region continues to deal with low interregional trade, civil unrests, famine and differences in external shocks.

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