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Exchange rate policy and export performance of WAMZ countries

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EXCHANGE RATE POLICY AND EXPORT PERFORMANCE OF WAMZ COUNTRIES

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Abstract

*This study examines the effect of independent exchange rate policy, relative to other determinants, on global export performance of WAMZ countries. The regression results show that exports originating from the Zone to the rest of the world are influenced positively by domestic output, export prices and exchange rate devaluations, but negatively by import price and economic performance of the major global trading partner, proxied by the US GDP. This result is not universal as the Gambia, Ghana and Guinea total exports functions show that exchange rate policy penalized exports contrary to the Nigerian case in which the coefficient estimate is significant and positive. The study infers that these results are consistent with theoretical expectation given the ironical divergence in export basket. Although they are all primary commodity exporters, Nigeria's exports is mainly crude oil, and **a priori** expectation is that rapid economic growth or booms in the US should lead to increased demand for energy (healthy competitions). In conclusion, the study infers that since independent flexible exchange rate policy makes no difference to the Zonal export performance **ex ante**, but have great potential for global exports collectively, they could explore an OCA to enhance both intra- and global inter-regional export trade.*

KEY WORDS: Exchange rate policy, export trade, panel data regression model, WAMZ.

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1.   Introduction

Exchange rate policy and export performance has been studied in a large number of theoretical and empirical papers globally, focusing on its regime, extent of volatility and nominal/real effects. While there seem to be no ambiguity about its general effects on export performance of developed economies, it is however debatable when analyzed from the perspective of developing countries. Indeed, for developed economies with convertible or traded currencies, the traditional view is that a rise in exchange rate volatility increases the uncertainty of profits on contracts denominated in a foreign currency. This risk leads risk-averse and risk-neutral agents to redirect their activity from higher risk foreign markets to the lower risk home market. Egert, et. al. (2005) notes that this assertion is not universal for developed countries as most studies show that there is no clear and statistically significant link between exchange rate regimes and aggregate or bilateral export flows.   Although a number of studies have pointed to the likelihood that exchange rate volatility could depress or have negative effects on exports of developing countries, it is again debatable if such effects would be significant given the fact that most of their currencies are un-traded but pegged to a basket of major traded currencies.

The pertinent research question that this study seeks to answer is: has an independent exchange rate policy of participating countries in the WAMZ been important in the determination of export performance to the extent that it could imply significant losses when they give up its control? The objective of this test is to assess the effect of exchange policy on global export performance of the WAMZ countries. The hypothesis to be tested is that independent exchange rate policies of the participating countries have been relatively ineffective in influencing export supply.

2.   Conceptual Framework and Literature Review

Foreign exchange rate is simply the rate at which one currency exchanges for another (Jhingan, 2006; Appleyard & Field , 1998). A most prominent issue in economic literature is the degree of exchange rate flexibility that should be permitted by any country. An exchange rate system is said to *fixed* if it permits only very small, if any, deviation from officially declared currency values. However, by *flexible* exchange rates, we mean rates that are completely free to vary. A hybrid of the two is represented by the Optimum Currency Area (OCA), which for optimal balance-of-payments adjustments and

effectiveness of domestic macroeconomic policy, has *fixed exchange rates* within the area but maintain *flexible exchange rates* with trading partners outside the area.

Foreign exchange rate policy relates to the determination of exchange rates under different exchange rate regimes. The central issue in the fixed-flexible exchange rate debate relates to provision of "domestic policy discipline" effects, the need to serve as instrument of greater growth in international trade and investment. It also includes the need to provide for greater efficiency in resource allocation and promotion of growth as well as forestall destabilizing speculations in foreign exchange markets (Appleyard & Field 1998). Since this paper is concern with examining the extend to which exchange rates policies of the 5 participating countries in the West African Monetary Zone (WAMZ) projects affected individual and zonal export trade with the rest of the world, a number of related literature is reviewed to provide the needed theoretical and analytical framework..

A number of economic analysts studied the direct and indirect effects of exchange rates policies on export performance. Egert, et. al. (2005) analyze the direct impact of exchange rate volatility on the export performance of ten Central and Eastern European transition economies as well as its indirect impact via changes in exchange rate regimes. The results suggest that the size and the direction of the impact of foreign exchange volatility and of regime changes on exports vary considerably across sectors and countries and that they may be related to specific periods.

Martin Berka (2005) asserts that the physical characteristics of goods and geography can explain both the puzzling persistence and volatility in the deviations of the international relative prices and the real exchange rate (the PPP persistence puzzle). He argues further that tradability of goods is endogenous, in that only goods with a deviation from the law of one price in excess of their trade cost are traded. He concludes that a model with quadratic adjustment costs in the volume of trade is also capable of creating real exchange rate volatility, and so can explain the PPP puzzle entirely as a trade phenomenon.

Duane, C., Philip R. Lane & Tara McIndoe (2006) investigated the impact of currency unions (OCA exchange rates arrangements) on Irish trade patterns. In contrast to most of the multi-country panel studies, they do not find any impact of EMU on trade. This, they argued is qualitatively consistent with the pattern noted by Baldwin (2006) that EMU has had a bigger impact on the 'core' member countries than on the peripheral member countries that have weaker economic linkages with the rest of the currency union. They however,

acknowledge that the time period may be too short to pick up the EMU effect on Irish trade, but noted the importance of the need to re-visit the study in a few years.

Egert et. al. (2005) notes that from an empirical point of view, the large body of literature focusing on developed countries generally cannot establish any clear and statistically significant link between exchange rate volatility and aggregate or bilateral export flows. Although Klein (1990), Bini-Smaghi (1991), and McKenzie (1998), among others, show in their studies that differentiating between sectors yields more encouraging results, evidence from sectoral data suggests that the impact of volatility differs both in magnitude and direction across sectors. Interestingly, Fontaigne and Freudenberg (1999) showed that exchange rate volatility has a negative impact on intra-industry trade. This last assertion seemed to be supported by Doroodian (1999), Chou (2000), Achy and Sekkat (2001), Siregar and Rajan (2002), Arize et al. (2004) and Baak (2004), which showed that for less developed countries exchange rate volatility has negative effects on multilateral, bilateral and sectoral export data. Generally speaking, these papers unanimously support the hypothesis that exchange rate volatility has a negative effect on exports flows. In other words, an increase in volatility appears to depress exports in less developed countries. Along these lines, a related question very few researchers have investigated is whether changes in exchange rate regimes which can be associated with a shift in the amplitude of volatility cause export flows to decrease.

3.   The Model

The underlying assumption of this model is that if exchange rate devaluation and/or volatility do not significantly influence the individual and collective trade flows of any group of countries to the rest of the world, then these countries would be better off by eliminating the incidental foreign exchange transactions costs through a fixed exchange rate arrangements among themselves. They are almost certain to face a common external market situation, and as such, they can collectively take a common stand when they trade with other third parties.

Although the selection of the correct trade equation in general and that of an export equation in particular is problematic, I adapt the specification by Egert and Morales-Zumaquero (2005) who analyzes the relationship between exchange rate volatility and trade flows for East and Central European countries in a very meticulous and systematic way. The export functions are estimated in nominal terms, and include domestic and foreign income (Y_{Di} and Y_{Fi}), relative prices (P_{Di} and P_{Fi}), usually defined as export prices

in the domestic economy and import prices in the foreign economy, the nominal exchange rate (Ex_{Ni}) for nominal exports (X_{Ni}) respectively.

The implicit function of this model takes the following form:

$$X_{Ni} = \oint \left(Y_{Di}, Y_{Fi}. P_{Di}, P_{Fi}, E_{XNi} \right) \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad (1)$$

Economic theory suggests that the impact of nominal and real income should be positive on nominal exports. Moreover, exchange rate depreciation may increase exports and the impact of domestic (foreign) relative prices on exports should be negative (positive).

Estimation Methods

Given that WAMZ is made up of 5 countries, the logical method to be adopted for estimation of equations (1) would be pooled or panel data regressions. The class of models that can be estimated using a pool object can be written as

$$y_{it} = \alpha_{it} + x_{it}' \beta_i + \varepsilon_{it} \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad (2)$$

where y_{it} is the dependent variable, x_{it} and β_i and are k-vectors of non-constant regressors and parameters for $i = 1, 2, \ldots, N$ cross-sectional units. Each cross-section unit is observed for dated periods $t = 1, 2, \ldots, T$. This basic specification treats the pool specification as a system of equations and estimates the model using system of OLS. This specification is appropriate when the residuals are contemporaneously uncorrelated, and time-period and cross-section homoskedastic:

$$\Omega = \sigma^2 I_N \otimes I_T \quad \cdots \quad \cdots \quad \cdots \quad \cdots \quad (3)$$

The coefficients and their co variances are estimated using the usual OLS techniques applied to the stacked model. However, since at the cross-sectional level, there is ample evidence to show that policy variables affect simultaneously GDP and CPI variables, the two equations would also be estimated using simultaneous equation estimation procedures for each country. Eviews econometric software package estimates simultaneous equations models, providing the directly the structural parameter estimates, The simultaneous equations estimation procedure is often adjudged to yield better and more efficient estimates of the parameters and coefficients of the regression models.

Data Sources and Adjustments

Using quarterly time series data, which span from 1991:1 to 2004:4, the effect of exchange rate policies on exports performance of participating countries in WAMZ was

evaluated. The Generalized Least Squares (GLS) was used to estimate the coefficients of the parameter estimates for the pooled equations results.   The dependent variable of the model is total exports while the explanatory variables include exchange rates, as well as fundamental determinants of export supply such as real income and export prices.   The data is made up of panel of 56 observations with the number of cross-sections used equals to 5 for exports functions.   The log linear equations were estimated through one-step weighting matrix, white heteroskedasticity-consistent standard errors and covariance matrix for a total panel (balanced) observations amounting to 280.

The major source of data for this analysis is IMF International Financial Statistics (2005) and Direction of Trade Statistics. Following our specification, the measure of total exports is as published in the IMF DOS statistics, while that of the independent variables, viz.: real GDP for the domestic and foreign partner country, import and export prices and exchange rates is as published in the IMF IFS.

4.   *Empirical Results*

The pooled regression result of the total export supply functions for the WAMZ participating countries is as shown in Table 1. Although the model specification reflected the influence of market fundamentals by including income and prices, the variable of interest is the exchange rate. The question which we seek to answer is to what extent do exchange rate policy matter to the export trade of participating countries, in spite of the fact that they are price takers in the world market?

Exchange Rate and WAMZ Total Export Supply Function

The regression result of export supply functions of WAMZ participating countries is shown in Table 1.   This result shows that on the aggregate, export supply of these countries is influenced positively by domestic output, export prices and exchange rates. This is consistent with theoretical expectation. Also, the sign of the parameter estimate of the foreign country GDP (reflected in our model by that of the United State of America, a major trading partner of these countries) is negative suggesting that an inverse relationship exists between WAMZ exports and US economic performance. One may therefore be tempted to conclude (perhaps erroneously) that WAMZ production (which ironically is dominated by primary sectors – mainly agriculture and mining) competes with the US production (which is dominated by secondary and tertiary economic activities).   While the signs of the parameter estimates of the US output with respect to The Gambia, Ghana and

Guinea total exports is consistent with this WAMZ export function, suggesting a substitution effects (especially so with the advents of synthetics and alternatives to primary raw materials as major input to US industrial production system), that of Nigeria and Sierra Leone suggest a complementary relationship between her exports and US economic growth. This may not be far from being correct also since the major exports of Nigeria to the US is mainly crude petroleum, and *a priori* expectation is that rapid growth or booms in the US economy leads to increased derived demand for crude oil to power her industries, as well as augment her domestic consumption of energy.

Interestingly, the sign and magnitude of the coefficient of the parameter estimate of exchange rate variable's effect on WAMZ export is

Table 1: Pooled Regression Results for WAMZ Export Functions		
	WAMZ	
Dep. Variable	TOT. EXPORTS	
Ind. Variable	Coef.	t-Stat.
LOG(GDP?)	1.16	2.9
LOG(USGDP?)	-1.59	-3.4
LOG(PE?)	0.96	19.6
LOG(PM?)	-0.23	-2.2
LOG(EXR?)	0.15	4.1
Fixed Effects		
_GAM--C	0.03	
_GHA--C	3.07	
_GUI--C	2.03	
_NIG--C	6.48	
_SLN--C	-0.23	
Weighted Statistics		
R-squared	0.9944	
Adjusted R-squared	0.9942	
S.E. of regression	0.5589	
Log likelihood	-107.63	
Durbin-Watson stat	0.63	
Mean dependent var		10.4
S.D. dependent var		7.3
Sum squared resid		84.3
F-statistic		5321.4
Prob(F-statistic)		0.0
Estimated using 5 x 1 Balanced Panel with n = 280 using Eviews GLS estimation proceedure		

positive and significant but inelastic suggesting that it is limitedly responsive to exchange rates devaluation. This is partially correct with respect to nominal exports and the reverse may be the situation if we consider the analysis in terms of real exports. This is because of the fact that as a group of primary commodities exporters and price takers in the world market, the short to medium term impact of devaluation is felt mainly through the realized income of the export sectors of the national economy. *A priori* information on the export sector performance of these economies showed that they suffered stagnation and attrition due to intense structural rigidities and internal economic distortions which limited their capacity to respond to price incentives. The expenditure switching effects (that normally accompanies devaluation with respect to export supply under a competitive market conditions) is therefore non-existent or absent in these economies. Rather than elicit the

desired supply response, it translated into increased cost of production arising from import of needed capital goods and raw materials. This, in turn, necessitated the adoption of stringent demand management policies that, in effect, counteracted the little gains arising there from.

This problem was accentuated during the pre- structural adjustment programme (SAP) eras when in addition to over valued exchange rates, domestic prices of exports were implicitly taxed as major source of government revenue and in post SAP through export and excise duties. It was also quite common that these countries individually adopted and intervened with free trade through the implementation of several non-tariff barriers as major instruments of trade policy. This tended to limit further the gains realized from foreign exchange earnings that accrued from export trade. Among them are exports licensing procedures, export bans, foreign exchange controls, regulated foreign exchange markets, rules with regard to foreign exchange realization and operations of domiciliary accounts and a host of others. In the light of these constraints, the net effect of the pursuit of trade and exchange rate policies for the WAMZ countries is felt solely within the domestic economy through realized domestic value of exports in the short to medium term as well as the administrative prices paid to the exports (depending on the individual countries export tax structure and non-tariff barriers) as well as marketing arrangements.

Ironically, the magnitude of the gains from exchange rates devaluation depended to a large extent on the foreign resource content of the exports. For primary agricultural exports emanating from existing plantations, especially in the case of cocoa, coffee and palm kernel that have high domestic resource content, devaluation enhanced their nominal export values. However, for grains and livestock production, which requires imported raw materials and feeds, devaluation helps to increase production costs and make the enterprise less competitive. It is quite apparent that devaluation helps to accentuate the implicit bias in protection against these sectors with low export potential but requiring very high foreign resource content for sustainability. This problem is more apparent for protected import substitution industries in these countries that were largely the appendage of multi-national corporations. Devaluation translated into increased cost of production, and the national appendages became quite uneconomical to operate. Most of them closed shops, and the anticipated gains from technological transfer foreclosed, primarily because of increased costs of production which followed devaluation.

A worrisome development which accompanied exchange rates policies of these countries was the adverse consequence of meeting the foreign exchange commitments

which accompanied foreign direct investments and external borrowing for the support of these industries. A good example is the case of multilateral borrowings and outstanding trade arrears that were financially profitable and economically viable at the ruling exchange rates at the time of contractual arrangement but became bad investments with devaluation. Evidence abounds in these countries which showed that many of the beneficiaries of such foreign export credit and guarantees not only became bankrupt following devaluation, but also their intermediating specialized financial institutions which packaged the loans on their behalf. Indeed, the exchange rates variation risks became so enormous to the extent that debt burdens which were mere amounts in national currencies became unserviceable huge and bad debts.

On the aggregate therefore, it does appear that erstwhile exchange rate policies, especially the high degree of devaluations which accompanied the implementation of SAPs by these countries did more harm to their export sector. Given the structure of their economies, they would have been better off to fix their exchange rates to that of their major trading partner while exploiting other demand management strategies to contend with the adverse balance of payments situation which they faced. However, there are a number of significant differences when we examine the subject from the perspective of each participating country in the WAMZ.

The Gambia and Nigeria: Exchange Rate and Total Export Supply Function

For ease of discussion, the regression results of The Gambia and Nigeria is presented in Table 2. The discussion of the two countries export functions together is informed by the similarities of the econometric properties of the supply functions when compared to the others with respect to the sign of the parameter estimates of the coefficient of the exchange rate variable. They show

Table 2: The Regression Results of The Gambia and Nigerian Total Export Supply Functions				
	GAMBIA		NIGERIA	
Dep. Variable	TOT. EXPORTS		TOT. EXPORTS	
Variable	Coeff.	t-Stat.	Coeff.	t-Stat.
LOG(GDP?)	-4.92	-3.2	0.49	2.2
LOG(USGDP?)	-7.79	-7.1	0.75	2.5
LOG(PE?)	-0.98	-0.7	1.03	25.4
LOG(PM?)	0.22	0.1	0.39	2.7
LOG(EXR?)	2.29	4.7	0.07	3.1
Fixed Effects				
_GAM--C	58.32			
_NIG--C			-3.98	
Weighted Statistics				
R-squared	0.4422		0.8820	
Adjusted R-squared	0.4236		0.8781	
S.E. of regression	0.7228		0.1363	
Log likelihood	-301.33		165.82	
Durbin-Watson stat	0.77		0.75	
Mean dependent var		2.1		8.3
S.D. dependent var		1.0		0.4
Sum squared resid		141.1		5.0
F-statistic		23.8		224.3
Prob(F-statistic)		0.0		0.0

that exchange rate has a significant positive relationship to exports in both countries. However, while it is very elastic in the case of The Gambia, it is relatively inelastic in the case of Nigeria. We however want to note that there are significant differences between the two countries export supply functions given the differences in the signs of the coefficient of the parameter estimates of each country's domestic and international output variables. Whereas both variables bear negative signs indicating that there is an inverse relationship between Gambian exports and both domestic and international economic growth (indicative of unhealthy competition), they bear a positive sign in the case of Nigeria, suggesting that domestic and international economic booms augur well for her exports sector (very healthy competition and complementary relationship). Another major difference is that whereas The Gambian exports were not responsive to export and import price variables, that of Nigeria was highly price responsive. This could also be a reflection of the major differences in the structure of export baskets of the two countries: while Nigeria is a major crude oil exporter, the Gambia depended solely on agricultural and minerals exports. As a crude oil exporter, Nigeria is able to protect her exports from the vagaries of international market through her membership of OPEC, an export cartel that has been instrumental at sustaining crude oil prices at very high levels. Nigeria's terms of trade have therefore been favourable. This is contrary to the Gambian case in which there has been persistent deterioration in her terms of trade in the face of stiff competitions which their exports face in the world commodity markets.

Ghana and Guinea: Exchange Rate and Total Export Supply Function

The regression results for Ghana and Guinea is being discussed together because of the weak econometric properties of the estimated equations. The

Table 3: The Regression Results of Ghana and Guinea Total Export Supply Functions				
	GHANA		GUINEA	
Dep. Variable	TOT. EXPORTS		TOT. EXPORTS	
Variable	Coeff.	t-Stat.	Coeff.	t-Stat.
LOG(GDP?)	1.18	3.0	0.30	1.1
LOG(USGDP?)	-0.59	-1.4	-0.40	-1.1
LOG(PE?)	0.42	1.3	1.02	5.4
LOG(PM?)	-0.06	-0.2	-0.74	-3.0
LOG(EXR?)	0.07	1.0	0.09	1.2
Fixed Effects				
_GHA--C	0.71			
_GUI--C			3.37	
Weighted Statistics				
R-squared	0.5534		0.1305	
Adjusted R-squared	0.5385		0.1016	
S.E. of regression	0.2108		0.1457	
Log likelihood	43.71		147.06	
Durbin-Watson stat	0.92		1.31	
Mean dependent var		5.9		5.1
S.D. dependent var		0.3		0.2
Sum squared resid		12.0		5.7
F-statistic		37.2		4.5
Prob(F-statistic)		0.0		0.0

Ghana equation presented in Table 3 suggests that her export is significantly influenced by domestic output while in the case of Guinea solely by export prices. The adjusted R-Square statistics for both equations also indicated a poor goodness of fit, in addition to the weak explanatory power of the exchange rate variable. Indeed, the estimate of coefficient of the exchange rate variable in the each of the country's export supply function is insignificant, confirming that it had no influence on the export supply of the country. It can therefore be inferred from the two equations that exchange rate adjustments, especially the type undertaken since the adoption of the structural adjustment programme by the two countries, did little to elicit the desired export supply-following response. It therefore follows that policy reforms that would deny these countries the use of exchange rate as instrument of adjustment would augur well for the countries, since their export supply was indifferent to them *ex ante*.

Sierra Leone: Exchange Rate and Total Export Supply Function

The regression result of Sierra Leone's export supply function is singled out for discussion because of the fact that the signs of the parameter estimate of the price and exchange rate explanatory variables defied *a priori* expectations. From the regression results presented in Table 4, we note that contrary to expectation, the sign of the coefficient of export prices is negative, thereby suggesting an inverse relationship that higher export prices acted as disincentives to exports. The only reasons why higher prices could discourage exports is under an anomalous situations such as adverse economic shocks, to the extent that the structure of export basket becomes biased in favour of 'inferior goods' and prevalence of high level of unrecorded trade and parallel market activities. This is most likely to be the situation in Sierra Leone during the period covered by this study as she was engaged in civil war which disrupted her economic activities. Little

Table.4: The Regression Results of WAMZ and Sierra Leone Total Export Supply Functions		
	SIERRA LEONE	
Dep. Variable	TOT. EXPORTS	
Variable	Coeff.	t-Stat.
LOG(GDP?)	5.96	18.0
LOG(USGDP?)	2.78	1.7
LOG(PE?)	-9.27	-6.8
LOG(PM?)	7.98	5.2
LOG(EXR?)	-0.51	-2.8
Fixed Effects		
_SLN--C	-28.66	
Weighted Statistics		
R-squared	0.6077	
Adjusted R-squared	0.5946	
S.E. of regression	0.7311	
Log likelihood	-304.52	
Durbin-Watson stat	0.87	
Mean dependent var		2.7
S.D. dependent var		1.1
Sum squared resid		144.3
F-statistic		46.5
Prob(F-statistic)		0.0

wonder also, that contrary to theoretical expectation of an inverse relationship between import prices and exports, the sign of the coefficient estimate of import prices is positive, suggesting that the higher import prices augur well for exports.

Another interesting contradiction in the Sierra Leone's export supply function is the sign and magnitude of the parameter estimate of the exchange rate variable coefficient. It is negative and significant suggesting that currency appreciation stimulates exports. Again, this result seem to be consistent as it corroborates our earlier argument proffered in the case of similar contradictory response of Sierra Leone's exports to export and import prices. The inference that can be drawn from this analysis so far is that exchange rate policy had adverse effects on export performance of Sierra Leone during the period covered by this study. It also appears that exchange rates were sources of major economic distortions since in general the fiscal and monetary authorities lost control over the macroeconomic management due to internecine war and crisis that ravaged it.

5.   *Summary of Findings, Policy Implications and Concluding Remarks*

The key findings of this study is that aggregate total export supply of WAMZ countries is influenced positively by domestic output and export prices, in line with theoretical expectation. However, foreign country GDP (reflected in this study by that of the United State of America, a major trading partner of these countries) is negative thereby implying an unhealthy competition or substitutions effects. This result is adjudged to be consistent with expectation for Gambia, Ghana and Guinea total exports functions. However, the positive relation of US GDP with Nigeria's exports, is also adjudged to be consistent with expectation since her export to the US is mainly crude oil. *A priori* expectation is that rapid US economic growth or booms leads to increase derived demand for energy to power her industries, as well as augment her domestic consumption (healthy competitions). However, exchange rates were relatively ineffective as instruments of export stimulations. This could be deduced by the level of insignificance of this variable in the individual and pooled export trade equation model, suggesting that these countries may gain more if they enter into a fixed exchange rate arrangements with each other.

In conclusion, it can be inferred that independence over the use of exchange rates policies as instruments of export stimulation have very limited usefulness. This is to be expected, since all the countries involved in the WAMZ project are individually a small country possessing non-convertible currencies. It therefore means that if they must trade with each other, they require a third-party convertible currency. This entails both

transactions and other microeconomic costs, which if eliminated could improve its export performance. This can be found in entering into a currency union, with subscription to irrevocable exchange rates among members, while taking a common stand against third parties with regard to external transactions.

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