

Impact of Exchange rate volatility on Global Value Chains Participation: Evidence from panel African countries

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Abstract:

The aim of this study is to investigate the impact of exchange rate volatility on global value chain participation within a panel of 25 African countries. The main result reveals that there is an adverse effect. When exchange rate volatility interacts with activities in upstreamness, we notice that the impact on GVC participation is significantly positive unlike the association between exchange rate fluctuation and sectors in downstreamness. The paper sheds some light on the role played by the currency union to promote trade in value-added. It is clearly shown that African countries which are non-members of a currency union have better performance in global value chain participation. These findings may enable, on the one hand, authorities in charge of monetary policy to implement strategies of mitigating this harmful impact on trade in value-added. On the other hand, it is worthwhile to in-depth the understanding of factors likely to distort trade performance within States members of a currency union particularly in the context of cross-border production-sharing activities.



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1. Introduction

Since the implementation of the floating exchange system in the early 1970s, academicians as well as policymakers are still concerned about the relationship between trade flows and exchange rate fluctuation. To this regard, Nicita (2013) suggests that “the exchange rate plays an important role in a country’s trade performance. Whether determined by exogenous shocks or by policy, the relative valuations of currencies and their volatility often have important repercussions on international trade, the balance of payments and overall economic performance”.

Up today, notwithstanding an extensive literature concerning the impact of exchange rate volatility on international trade, research remains inconclusive. In a similar vein, McKenzie (1999, p.100) affirms that “a general conclusion to be drawn from the literature (i.e., between exchange rate volatility and trade flows) is that a fundamental unresolved ambiguity exists”. Indeed, some empirical studies support a negative influence of exchange rate volatility on trade (e.g. Bahmani-Oskooee, 2002; Arize et al., 2000; Dell’Ariccia, 1999); others in contrast provide evidence of a positive effect (e.g. Collins, 2018; Awokuse and Yuan, 2006; Hwang and Lee, 2005); there are also a handful of authors who find mixed results (e.g. Senadza and Diaba, 2017; Hsu and Chiang, 2011; Bahmani-Oskooee, 1991). Regardless of the empirical methods applied, the main feature of the previous research is the use of conventional measures of trade based on gross exports and imports flows. Yet, the nature of trade has completely shifted over more than two decades because global production is increasingly fragmented. As a matter of fact, Johnson and Noguera (2012, p.224) report that “trade in intermediate inputs accounts for as much as two thirds of international trade”.

Unlike the existing papers, the contribution of our work is threefold. First, we examine the impact of exchange rate volatility on global value chains participation (GVC) within African economies where research is scant. The particularity of the measures of GVC recently developed by Wang et al. (2017a,b) is the distinction between the share of factor content that crosses borders only once (simple GVC) and the proportion that straddles at least two countries (complex GVC)¹. Second, we explore the simultaneous influence of the exchange rate and the position in GVC. This latter refers to the location of an economy along the creation process of value-added: either in upstreamness (Antras and Fally index) or in downstreamness (Antras and Chor index). According to van der Marel (2015, p.4): “a country specializing in upstream (downstream) activities if it imports a low (high) share of intermediate and exports a high (low) share of intermediate exports to third countries’ exports”. Finally, this study employs a dummy taking 1 for countries belonging to the currency union and 0 otherwise. The aim of this variable is to investigate whether the currency union may stimulate the engagement in factor content trade compared to those which are not members.

The remainder is as follows: section 2 presents the literature review; section 3 is about the empirical framework; sections 4 and 5 provide respectively benchmark and robust results and section 6 concludes.

2. Literature review of empirical papers

The empirical literature examining the impact of exchange rate (volatility) on international trade is divided into three groups: authors provide evidence of a negative effect while others support the existence of a positive influence, another group of researchers suggest a mixed effect.

The work by Hooper & Kohlhagen (1978) is viewed as one of the early empirical attempts analyzing the implications of exchange rate uncertainty on trade flows between major industrialized economies². Their finding reveals in overall that increased exchange risk affects adversely the volume of bilateral trade even though the coefficients are not significant. Afterwards, Cushman (1986) examines the impact of third-country exchange risk on bilateral trade. To be specific, the author analyzes how exchange rate volatility of OECD countries does affect the trade relationship between the US and its six largest partners (UK, Netherlands, France, Germany, Canada and Japan). His evidence shows that third-country exchange rate volatility has a direct and significant detrimental effect on the bilateral trade between the US and its key partners.

Similarly, Kenen and Rodrik (1986) focus on a sample of industrial economies and study in which extent exchange risk affects imports. Their empirical validation puts forward the harmful impact of exchange rate volatility on the volume of imports. Likewise, Thursby and Thursby (1987), in addition to test the Linder hypothesis, inspect the impact of exchange risk on bilateral trade on a sample of 17 countries. Their empirical result shows that the uncertainty of exchange rate has a noxious effect on trade flows. Within a sample of industrial countries, Perée and Steinherr (1989) prove that, except the United States, exchange rate risk has an unfavorable impact on trade flows.

Using error-correction models, Chowdhury (1993) explores the influence of exchange rate volatility on trade flows within the G-7 countries. The author shows that the volatility in exchange rate impacts significantly and negatively the level of exports. On the basis of the sample of the European Union's countries, Dell'Ariccia (1999) finds robust results proving that the fluctuations of exchange rate dwindles trade flows. Arize and others (2000) study the nexus between exchange rate volatility and foreign trade within Less Developed Countries (LDCs). They employ Johansen cointegration and error-correction technique to prove that export flows of the sampled economies strongly decline due to the high variability of exchange rate. Bahmani-Oskooee (2002) focuses his analysis on the influence of black market exchange volatility on international trade within The Iran economy. The author uses cointegration analysis and reveals that the fluctuation of exchange rate is harmful for trade flows.

Unlike the previous papers and the conventional approach suggesting the detrimental effect of exchange rate volatility on international, McKenzie and Brooks (1997) find out that the impact of exchange rate fluctuation between the German-US trade flows is positive over the period 1973-1992. In the same vein, Broll and Eckwert (1999) show that the positive link between the uncertainty of exchange rate and international trade has a theoretical basis. In addition, their empirical validation supports that the higher volatility of exchange rate the greater the benefits for trade. Hwang and Lee (2005) examine in which extent the volatility of

exchange rate affects trade flows in the UK in the 1990s. The two scholars reveal the existence of a positive relationship between the uncertainty of exchange rate and particularly imports.

To support the previous findings, Awokuse and Yuan (2006) investigate the impact of exchange rate volatility on US poultry exports over two subperiods spanning 1976-1985 and 1986-2000. They use panel regression with fixed effects and discover the existence of a positive nexus between the fluctuation of exchange rate and poultry exports. Recently, Collins (2018) studies the influence of exchange rate fluctuation on trade flows for the BRICS Nations (Brazil, Russia, India, China and South Africa). The author shows that the effect of exchange rate volatility is positive but insignificant. The explanation of this result according to Collins is that high growth rates within the BRICS countries could be responsible for mitigating the adverse impact of exchange rate.

Using the same data of Hooper & Kholhagen (1978), Cushman (1983) finds significant coefficients but his results are dichotomic. On the one hand, it is shown that uncertainty in exchange rate impacts negatively trade flows; on the other hand, the coefficients turns into positive. The researcher suggests that the use of a different measurement of exchange rate volatility has made the distinction with the result of the previous paper. Bahmani-Oskooee (1991) uses a sample of developing countries (Brazil, Korea, Greece, Pakistan, Philippines, Thailand and Turkey) over the period 1975-1985 to inspect how exchange rate fluctuation influences upon trade flows. The author finds a negative impact of exchange rate volatility on imports in Pakistan, Thailand and Turkey while the effect is positive on exports Brazil and Korea.

The paper by Hsu and Chiang (2011) reveals that the impact of exchange rate volatility on exports depends on the level of partners' income. Indeed, they use bilateral trade data from the US to its partners and their results show that the uncertainty of exchange rate influences adversely exports to high-income economies while the reverse trend is observed for low-income countries. Senadza and Diaba (2017) explore the effect of exchange rate volatility on international trade within Sub-Saharan African economies. Employing the pooled mean-group estimator of dynamic heterogeneous panels technique, they reveal that the impact of exchange risk is dependent on the nature of the relationship between variables. It is shown that there is a negative influence of the exchange rate volatility on exports in the short-run while the effect turns into positive in the long-run.

3. Econometric framework

The econometric framework proposes the model investigating the impact of the exchange rate volatility on global value chains participation. The model is specified following the previous authors in the literature but the difference of our regression is the use of different measurements of trade flows:

$$\log GVC_{ijt} = \beta_0 + \beta_1 \log ERV_{it-1} + \beta_2 \log U_{ijt} + \beta_3 \log D_{ijt} + \beta_4 \log GDPPC_{it} + \beta_5 \log INF_{it} + \lambda_{ij} + \mu_t + \varepsilon_{ijt} \dots \dots \dots (1)$$

In equation (2), we introduce two interaction terms. The first is obtained between exchange rate and the position in upstream while the second concerns the nexus between exchange rate and the position in downstreamness:

$$\log GVC_{ijt} = \alpha_0 + \alpha_1 \log(\text{interaction terms})_{it} + \alpha_2 \log GDP_{it} + \alpha_3 \log INF_{it} + \lambda_{ij} + \mu_t + \omega_{it} \dots \dots \dots (2)$$

where GVC stands for global value chains participation (forward linkage) as the country-sector dependent variable; ERV denoting exchange rate volatility is the main variable of interest; U and D symbolize respectively the indexes of upstreamness and downstreamness; GDP_{it} represents GDP per capita and used as proxy of economic development; INF indicates inflation and employed for macroeconomic (in)stability; λ_{ij} is the country-sector unobserved effects; μ_t is the time fixed effects; ε and ω are the independent and identically distributed error term with mean zero and constant variance; β (from 1 to 5) and α (from 1 to 3) are the coefficients to be estimated; β_0 and α_0 are both the intercepts; i, j and t represent respectively country, sector and year; log is the short form of logarithm.

To estimate the two equations, we use panel ordinary least square (POLS) with fixed effects over the three reference years (2004, 2007, 2011)³. We include the lag of exchange rate volatility in the model to deal with potential endogeneity issues, omitted variables and measurement errors⁴. Before running the baseline equations (1 and 2), we compute exchange rate volatility in accordance with the formula used by Nicita (2013, p.3):

$$ERV_{it} = \text{std.dev.} [\ln(ER_{it}) - \ln(ER_{it-1})]$$

where ER means exchange rate; std.dev. is the short form of standard deviation; i and t denote respectively country and year.

The analysis of descriptive statistics (Table 1) shows that African countries under review have an average participation in value-added directly absorbed by foreign partners two times higher than the share of factor content used at least by two countries. It is displayed that the mean of exchange rate volatility within the sampled economies is very low at 0.03. We also notice that the measure of downstream position (Antras and Chor index) is on average slightly greater than the indicator of upstream position (Antras and Fally index). GDP per capita is on average more than 4000 USD among African countries used in this study. Table 1 exhibits that the mean level of inflation in the sampled countries is 7.56% per year.

Table 1: Descriptive statistics

	Observations	Mean	Std.deviation	Min.	Max.
Simple GVC (forward linkage)	3225	0.12	0.12	0	0.74
Complex GVC (forward linkage)	3225	0.06	0.08	0	0.82
Exchange rate volatility	3225	0.03	0.09	0.002	0.51
Upstreamness	3225	2.21	0.84	1	5.77
Downstreamness	3225	2.26	0.64	1	4.42
GDP per capita (USD)	3225	4229.06	4023.33	673.42	16561.77
Inflation	3225	7.56	5.54	-2.89	20.06

Source: The author's calculations

4. Benchmark results and discussions

The benchmark results based on panel OLS with fixed effects are displayed in Table 2. It is shown that the highest explanatory power of the model is 43%. The observation of the estimated coefficient associated with exchange rate reveals a negative and highly significant impact for the two forms of forward participation in value-added trade. Our analysis suggests that a unit-percentage appreciation of the exchange rate volatility shrinks the engagement in simple and complex GVC by 0.0006% (columns I and IV). The position in upstreamness influences positively and significantly at the 1% level the participation in forward linkage of value-added trade. The magnitude of the coefficients shows that sectors in upstream exporting to direct partners increase their factor content nearly by 2% (column I) while those engaged in the long process of value chain experience a growth of 2.25% (column IV).

However, the impact of being in downstreamness affects adversely the involvement in GVC. The coefficient related to forward simple value-added albeit negative is not significant (column I) whereas the coefficient of forward complex factor content is statistically significant at the 10 percent level. This proves that the participation in complex trade in value-added decreases by 0.51% (column IV) for sectors located in downstream. GDP per capita as the proxy of economic development displays positive and significant coefficients. This suggests that an improvement in the level of income per capita in terms of purchasing power parity, the share of value-added to export raises respectively by 1.52% (column I) for simple GVC and 1.38% (column IV) for complex GVC. The economic meaning of this finding might be that an increase in the purchasing power within African economies, the consumers tend to import final goods from abroad. Accordingly, domestic value-added is exported to foreign partners.

Table 2: Exchange rate and GVC participation based on Panel OLS

	forward simple GVC			forward complex GVC		
	I	II	III	IV	V	VI
Exchange rate	-0.0006*** (0.0002)	–	–	-0.0006*** (0.0002)	–	–
Interaction term 1	–	0.0005*** (0.0001)	–	–	0.0006*** (0.0001)	–
Interaction term 2	–	–	-0.0004*** (0.0001)	–	–	-0.0005*** (0.0001)
Upstreamness	1.98*** (0.107)	–	–	2.25*** (0.106)	–	–
Downstreamness	-0.48 (0.302)	–	–	-0.51* (0.298)	–	–
GDP per capita	1.52** (0.694)	3.62*** (0.795)	3.08*** (0.792)	1.38** (0.684)	3.74*** (0.818)	3.18*** (0.814)
Inflation	-0.81*** (0.079)	-1.01*** (0.091)	-1.02*** (0.090)	-0.68*** (0.078)	-0.91*** (0.094)	-0.92*** (0.092)
Observations	2106	2106	2106	2106	2106	2106
Country-sector	1075	1075	1075	1075	1075	1075
R-squared	0.40	0.20	0.21	0.43	0.17	0.18

Source: The author's estimates

Note: ***, ** and * denote respectively statistical significance at 1%, 5% and 10% levels. Robust standard errors in parentheses. Interaction term 1 is the simultaneous effect between exchange rate and upstreamness. Interaction term 2 concerns the combined effect between exchange rate and downstreamness. We do not report the coefficients of the intercepts. Country-sector and year fixed effects are also included in the regression.

In Table 1, we observe that the average inflation in Africa over the period of study is 7.56%⁵. This high figure proves an instable macroeconomic environment. To this regard, the results indicate that the coefficients of inflation are negative and strongly significant. The finding means that a raise of 1 percent per year of inflation above the acceptable level (1-2%) makes the macroeconomic environment risky and therefore dwindles the proportion of factor content to export. In particular, the quantity of value-added directly absorbed abroad decreases by 0.81% (column I) while the share of value-added indirectly consumed undergoes a drop of 0.68% (column IV).

When we consider the interaction terms, it clearly appears that there is a divergence of sign. In fact, the joined effect of exchange rate fluctuation within sectors engaged in upstream activities is statistically significant and positive on the participation in value-added trade. Simple and complex GVC increases respectively by 0.0005% (column II) and 0.0006% (column V). In contrast, the association between exchange rate volatility and the position in downstreamness leads to a shrinkage of 0.0004% (column III) and 0.0005% (column VI) for simple and complex GVC participation respectively. In addition, the coefficients of the control variables, GDP per capita and inflation, present the same sign as mentioned previously and are significant (see columns II, III, V and VI).

5. Robustness check

In order to examine the soundness of the baseline results, we carry on the robustness check. To do so, an additional control variable is included in the empirical model (see equations 3 and 4). This additional control variable is a dummy variable that takes the value one for African countries belonging to the currency union (CU) and zero otherwise (see Table A1 in Appendix). If we estimate these equations using panel OLS with fixed effects, the currency union is omitted because of collinearity. Accordingly, to overcome this problem, we apply a new estimation technique, namely panel fixed-effects vector decomposition (FEVD), that considers time-invariant and rarely changing variables in panel analyses⁶.

$$\log GVC_{ijt} = \beta_0 + \beta_1 \log ERV_{it-1} + \beta_2 \log U_{ijt} + \beta_3 \log D_{ijt} + \beta_4 \log GDPPC_{it} + \beta_5 \log INF_{it} + \beta_6 CU + \varepsilon_{ijt} \dots \dots \dots (3)$$

$$\log GVC_{ijt} = \alpha_0 + \alpha_1 \log(\text{interaction terms})_{it} + \alpha_2 \log GDPPC_{it} + \alpha_3 \log INF_{it} + \alpha_4 CU + \omega_{ijt} \dots \dots \dots (4)$$

The robust results are presented in Table 3. On the whole, the estimated coefficients of the explanatory variables are in line with the baseline outcomes. Unlike the regression of equations 1 and 2, the explanatory power of equations 3 and 4 is higher at more than 70 percent. Our variable of interest, exchange rate volatility, still has a negative and significant impact on the participation in simple and complex GVC, and we observe that the magnitude of the robust coefficients are slightly greater than the benchmark coefficients. It is shown that the level of GVC involvement in factor content to export reduces by 0.0007% (columns I and IV).

The influence of the position in upstreamness is also statistically significant and positive on the engagement in forward linkage of value-added. Compared to the reference coefficients, we notice that the size of the robust coefficients is higher. By contrast, although the sign of the downstreamness variable is negative, the coefficients are insignificant and their magnitude does not differ from the baseline results. The robustness check also reveals that the estimated coefficients of GDP per capita are not statistically different from zero and their signs are divergent: some are negative while others are positive. It should be noted that the level of economic development is not a robust variable regarding the sample used in this study and over the three reference years.

Table 3 shows that inflation as measure of macroeconomic (in)stability presents the coefficients in conformity with the previous results in Table 2. The only difference is the sizeable effect of the robust findings. This finding supports the idea that an unreliable macroeconomic environment is harmful for the participation in GVC both for simple and complex forward linkage.

Table 3: Exchange rate-GVC participation nexus based on Panel FEVD

	forward simple GVC			forward complex GVC		
	I	II	III	IV	V	VI
Exchange rate	-0.0007*** (0.0002)	–	–	-0.0007*** (0.0002)	–	–
Interaction term 1	–	0.0005*** (0.0002)	–	–	0.0005*** (0.0002)	–
Interaction term 2	–	–	-0.0005*** (0.0001)	–	–	-0.0005*** (0.0001)
Upstreamness	2.01*** (0.171)	–	–	2.28*** (0.1703)	–	–
Downstreamness	-0.48 (0.352)	–	–	-0.52 (0.350)	–	–
GDP per capita	-0.34 (1.424)	0.12 (2.131)	0.42 (1.820)	-0.21 (1.412)	0.34 (2.190)	0.66 (1.884)
Inflation	-0.90*** (0.142)	-1.18*** (0.280)	-1.15*** (0.209)	-0.75*** (0.142)	-1.08*** (0.288)	-1.04*** (0.217)
Currency union	-1.47** (0.622)	-1.78** (0.835)	-1.48* (0.763)	-1.25** (0.617)	-1.58* (0.858)	-1.26 (0.791)
Observations	2106	2106	2106	2106	2106	2106
R-squared	0.80	0.72	0.74	0.82	0.73	0.74

Source: The author's estimates

Note: ***, ** and * denote respectively statistical significance at 1%, 5% and 10% levels. Robust standard errors in parentheses. Interaction term 1 is the simultaneous effect between exchange rate and upstreamness. Interaction term 2 concerns the combined effect between exchange rate and downstreamness.

The two interaction terms confirm as well the results found in the baseline estimation. Indeed, the combined effect between exchange rate and the position in upstreamness is stimulating for the engagement in the forward value chain. On the contrary, when exchange rate interacts with downstream activities, there is a detrimental impact on the participation in GVC.

Furthermore, the dummy variable included in the robust regressions, representing the currency union, exhibits negative and significant coefficients. This means that countries sharing the same currency (not necessarily with further integration) have a lower

engagement in GVC. Although our finding differs from the conventional approach of the currency union which is expected to promote trade of its members more than non-members (see e.g. Rose *et al.*, 2000; Rose and Honohan, 2001), it is nevertheless supported by the work of Micco and others (2003). These authors examine the effect of the currency union on Trade between the members of the Economic and Monetary Union (EMU) in Europe over the period 1992-2002. They show that the benefit of participating in international trade is larger among the non-members of EMU compared to the members.

6. Conclusion

In this paper we investigate mainly the impact of exchange rate volatility on the participation in global value chains within African countries. In addition, we shed some light on the simultaneous effect on GVC engagement when exchange rate volatility interacts with activities in upstreamness or downstreamness. Another important aspect of this research is to examine whether the participation in GVC of a currency union's members is higher than those which are not members. For the benchmark results, we employ panel ordinary least square with fixed effects, whereas the robustness check is carried out through panel fixed-effects vector decomposition (FEVD) because a dummy variable is included into the model.

The results show that, albeit the magnitude of the coefficients is relatively low, the fluctuation in exchange rate has a significant detrimental effect on the participation in value-added to exports. This adverse impact does not differ between direct and indirect engagement in GVC. When it comes to interaction terms, the study reveals that the joined impact between exchange rate volatility and sectors in upstreamness promotes the involvement in GVC, while the combined action between uncertainty of exchange rate and activities in downstreamness hinders the level of factor content to exports. Moreover, the findings highlight that African countries and members of a currency union are less performant than non-members in the participation in value-added trade.

These findings may enable, on the one hand, authorities in charge of monetary policy to implement strategies of mitigating this harmful impact on trade in value-added. On the other hand, it is worthwhile to in-depth the understanding of factors likely to distort trade performance within States members of a currency union particularly in the context of cross-border production-sharing activities.

Notwithstanding the contribution of this research to the empirical literature, its drawback is essentially based the lack of getting access to exchange rate monthly data for most African countries. Because the larger the available exchange rate data per month, the more accurate and reliable is the measurement of volatility, unlike yearly data over the period under review. For further research, we suggest not only to using of monthly data but also investigating in which extent exchange rate misalignment may impact the participation in global value chains particularly for economies located in Africa.

Footnotes

¹ The data concerning global value chain participation indexes come from the Research Institute for Global Value Chains at University of International Business and Economics.

² Their regression analysis is based on the earliest theoretical approach from Ethier (1973).

³ After performing the Hausman test, we get a p-value < 0.05. This means that the model specification rejects random effects and therefore we accept fixed effects.

⁴ Hau (2002) affirms that: “differences in trade openness explain a large part of the cross-country variation in the volatility of the effective real exchange rate”.

⁵ Generally, the acceptable inflation level is between 1 and 2 percent annually. However, our data reveal that inflation is 7.12% in 2004, 7.26% in 2007 and 8.3% in 2011.

⁶ Refer to Plümper and Troeger (2007, 2011) for further details.

References

- Antras, P., Chor, D., Fally, T., Hillberry, R. (2012), “Measuring the Upstreamness of Production and Trade Flows”, *American Economic Review: Papers & Proceedings* 2012, 102 (3):412-416.
- Antras, P., Chor, D. (2013), “Organizing the Global Value Chain”, *Econometrica*, Vol. 81, No.6, pp. 2127-2204.
- Arize, A.C., Osang, T., Slottje, D.J. (2000), “Exchange-Rate Volatility and Foreign Trade: Evidence from Thirteen LDC’s”, *Journal of Business & Economic Statistics*, 18:1, pp.10-17.
- Awokuse, T., O., Yuan, Y. (2006), “The Impact of Exchange Rate Volatility on US Poultry Exports”, *Agribusiness*, Vol. 22 (2), pp.233-245.
- Bahmani-Oskooee, M. (1991), “Exchange Rate Uncertainty and Trade Flows of Developing Countries”, *Journal of Developing Areas*, Vol. 25, No. 4, pp.497-508.
- Bahmani-Oskooee, M. (2002), “Does black market exchange rate volatility deter the trade flows? Iranian experience”, *Applied Economics*, 34: 18, pp.2249-2255.
- Broll, U., Eckwert, B. (1999), “Exchange Rate Volatility and International Trade”, *Southern Economic Journal*, Vol. 66, No. 1, pp.178-185.
- Chowdhury, A.R. (1993), “Does Exchange Rate Volatility Depress Trade Flows? Evidence from Error-Correction Models”, *Review of Economics and Statistics*, Vol. 75, No. 4, pp.700-706.
- Collins, C. (2018), “The Effect of Exchange Rate Volatility on Aggregate Trade Flows for the BRICS Nations”, *The Park Place Economist*, Vol. 26, Issue 1, pp.43-54.
- Cushman, D.O. (1983), “The Effects of Real Exchange Rate Risk on International Trade”, *Journal of International Economics* 15 (1983), pp.45-63.
- Cushman, D.O. (1986), “Has Exchange Risk Depressed International Trade? Impact of Third-Country Exchange Risk”, *Journal of International Money and Finance* (1986), 5, pp.361-379.
- Dell’Ariccia, G. (1999), “Exchange Rate Fluctuations and Trade Flows: evidence from the European Union”, *IMF Staff Papers*, Vol. 46, No. 3, pp. 315-334.
- Ethier, W. (1973), “International Trade and the Forward Exchange Market”, *American Economic Review*, Vol. 63, No. 3, pp.494-503.
- Hau, H. (2002), “Real Exchange Rate Volatility and Economic Openness: Theory and Evidence”, *Journal of Money, Credit and Banking*, Vol. 34, No. 3, pp.611-630.
- Hooper, P., Kohlhagen, S.W. (1978), “The Effect of Exchange Rate Uncertainty On the Prices and Volume of International Trade”, *Journal of International Economics* 8, pp.483-511.

- Hsu, K-C., Chiang, H-C. (2011), "The threshold effects of exchange rate volatility on exports: Evidence from US bilateral exports", *Journal of International Trade & Economic Development*, Vol. 20, No. 1, pp.113-128.
- Hwang, H-d., Lee, J-W. (2005), "Exchange Rate Volatility and Trade Flows of the UK in 1990s", *International Area Review*, Vol. 8, No. 1, pp.173-182.
- Johnson, R.C., Noguera, G. (2012), "Accounting for intermediates: Production sharing and trade in value added", *Journal of International Economics* 86 (2012), pp.224-236.
- Kenen, P.B., Rodrik, D. (1986), "Measuring and Analyzing the Effects of Short-Term Volatility in Real Exchange Rates", *Review of Economics and Statistics*, Vol. 68, No. 2, pp.311-315.
- Micco, A., Stein, E., Ordoñez, G., Midelfart, K. H., Viaene, J-M. (2003), "The Currency Union Effect on Trade: Early Evidence from EMU", *Economic Policy*, Vol. 18, No. 37, pp.315-356.
- McKenzie, M.D., Brooks, R.D. (1997), "The impact of exchange rate volatility on German-US trade flows", *Journal of International Financial Markets, Institutions and Money* 7, pp.73-87.
- Nicita, A. (2013), "Exchange Rates, International Trade and Trade Policies", *Policy Issues in International Trade and Commodities Study Series No. 56, UNCTAD/ITCD/TAB/57*.
- Perée, E., Steinherr, A. (1989), "Exchange Rate Uncertainty and Foreign Trade", *European Economic Review* 33, pp. 1241-1264.
- Plümper, T., Troeger, V.E. (2007), "Efficient Estimation of Time-Invariant and Rarely Changing Variables in Finite Sample Panel Analyses with Unit Fixed Effects", *Political Analysis*, Vol. 15, No. 2, *Special Issue: Time-Series Cross-Sectional Analysis*, pp.124-139.
- Plümper, T., Troeger, V.E. (2011), "Fixed-Effects Vector Decomposition: Properties, Reliability, and Instruments", *Political Analysis*, Vol. 19, No. 2, pp.147-164.
- Rose, A.K., Lockwood, B., Quah, D. (2000), "One Money, One Market: The Effect of Common Currencies on Trade", *Economic Policy*, Vol. 15, No. 30, pp.7-45.
- Rose, A.K., Honohan, P. (2001), "Currency Unions and Trade: The Effect is Large", *Economic Policy*, Vol. 16, No. 33, pp.449-461.
- Senadza, B., Diaba, D.D. (2017), "Effect of exchange rate volatility on trade: Evidence from selected Sub-Saharan African countries", *Journal of African Trade*, Vol. 4, Issue 1-2, pp. 20-36.
- Thursby, J.G., Thursby, M.C. (1987), "Bilateral Trade Flows, the Linder Hypothesis, and Exchange Risk", *Review of Economics and Statistics*, Vol. 69, No. 3, pp.488-495.
- Wang, Z., Wei, S., Yu, X., Zhu, K. (2017a), "Measures of Participation in Global Value Chain and Global Business Cycles", *NBER Working Paper No. 23222, NBER, Cambridge, MA*.
- Wang, Z., Wei, S., Yu, X., Zhu, K. (2017b), "Characterizing Global Value Chains: Production Length and Upstreamness", *NBER Working Paper No. 23261, NBER, Cambridge, MA*.

Appendix

Table A1: Sampled African Economies (25) and Currency union

country	currency union	country	currency union	country	currency union
1. Benin	1a	11. Guinea	0	21. South Africa	1c
2. Burkina Faso	1a	12. Kenya	0	22. Tanzania	0
3. Cameroon	1b	13. Madagascar	0	23. Tunisia	0
4. Cote d'Ivoire	1a	14. Malawi	0	24. Uganda	0
5. Senegal	1a	15. Mauritius	0	25. Zambia	0
6. Togo	1a	16. Morocco	0		
7. Botswana	0	17. Mozambique	0		
8. Egypt	0	18. Namibia	1c		
9. Ethiopia	0	19. Nigeria	0		
10. Ghana	0	20. Rwanda	0		

Source: The author

Note: 1a (Western Africa), 1b (Central Africa) and 1c (Southern Africa) represent countries belonging to a currency union and 0 otherwise.

Table A2: Description of variables

variables	description	source
Simple GVC (forward linkage)	Percentage of engagement in direct forward linkage	UIBE-Global Value Chain Indexes database
Complex GVC (forward linkage)	Percentage of engagement in indirect forward linkage	
Upstreamness index	Position in upstreamness	
Downstreamness index	Position in downstreamness	
Exchange rate	Exchange rate, national currency/USD (market+estimated)	Penn World Table, version 9.0
GDP per capita (USD)	GDP per capita based on purchasing power parity (PPP) (constant 2011 international USD)	World Development Indicators
Inflation (%)	Inflation as measured by the consumer price index reflects the annual percentage change	

Source: The author

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