

The Challenging Journey to Floating: How Did Both the Steering of the Transition And COVID19 Transform the Domestic Forex Market in Africa?

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Abstract

This article investigates the impacts of transition process steering and the COVID19 pandemic on domestic forex market behavior. To do so, we conducted a comparative analysis based on various GARCH family models and the case of four African countries which adopted different transition paths from fixed to intermediary and/or floating regimes. Our main empirical result is that smooth and gradual transition allows for a better adaptation of the domestic market actors, resulting in improved liquidity management and shocks absorption than countries with forced regime switch. We also notice a significant fallout from the COVID19 pandemic on economies where the regime transition was abrupt as the domestic forex market became more sensitive to endogenous factors. Finally, we presented critical policy implications and some suggestions for future studies.

Keywords: Exchange Rate, Monetary Policy, COVID-19

Introduction

Following the collapse of the Bretton Woods agreements in the early 1970s, countries worldwide were left faced with the urgency to quickly adopt an alternative exchange rate regime to shield their economies from the currencies markets' erratic movements. Authorities unfamiliar with the wild swings of volatility at the time were forced to put in place drastic measures to curb capital movements and struggled to stick within the fixed exchange rate framework to reduce the havoc fallouts of the resulting international monetary disorder. If developed economies managed to switch forcedly to the free float regime and adapted gradually to its mechanisms, small and developing countries instead were hesitant to embark on the flexibilization process of their foreign exchange regimes as they lacked the institutional prerequisites, market-based resources allocation system, functional capital markets, sound macroeconomic fundamentals in addition to the famous "Fear of Floating" presented in the work of (Calvo & Reinhart, 2002) which exhibited various examples of countries having announced the transition to floating but have been maintaining interventionist monetary policies to steer exchange rate movements as they fear a significant depreciation of their domestic currencies.

However, in a world where globalization prevails and integration in the worldwide economy is a crucial necessity for every country to achieve robust economic growth, sticking to fixed exchange regimes becomes burdensome to many developing and emerging countries and significantly contributed during the 1990s to the outbreak of several global financial crises such

as the Mexican crisis in 1994 and the Asian crisis in 1997/1998. African economies relying on primary commodities and vulnerable to exchange rate disturbances were explicitly impacted. Several countries with fixed exchange rate regimes have initiated flexibilization processes by moving to a more flexible intermediary regime as part of a gradual transition to free-floating; meanwhile, others were forced to switch directly to floating regimes. The steering of this transition process, whether incremental or abrupt, has undoubtedly significant effects on the various domestic forex market characteristics and participants' behavior. Unfortunately, studies addressing those impacts are almost non-existent in empirical research for African countries and are occasionally mentioned only in multilateral organizations country reviews. This lack of literature may constitute a real barrier for countries trying to embrace a gradual and orderly transition to a floating exchange rate regime. As a matter of fact, given the challenging economic context resulting from the repercussions of the COVID19 pandemic and the major disruptions to international trade, monetary authorities in the African continent are seeking roadmaps for a successful transition and avoiding a forced and chaotic switch to a floating-rate regime.

Our study's original contribution is to investigate the impacts of transition process steering and the COVID19 pandemic on domestic forex market behavior. To do so, we will use comparative methodology based on the case of four African countries that undergo different transition paths from fixed to intermediary and/or floating regimes as well as various univariate and multivariate GARCH family models. Our article will be organized as follows: We will present our data and methodology in Section 2, followed by empirical results in Section 3 and a conclusion accompanied by policy implications in Section 4.

Data and Theoretical framework

Data

Our study will use official closing rates from four African countries (Morocco, Tunisia, South Africa, and Egypt) which initiated a gradual or forced transition process to intermediary or floating regimes. We choose the EUR/USD pair as a proxy for the international market to assess the domestic forex market's interdependence. We collected our time series from the central banks' websites. To thoroughly investigate the impact of transition steering and COVID19 pandemic, we will split our study periods into three subperiods. The first period is characterized by a fixed regime and will serve as a benchmark for comparison. The second period will start with the transition to the new regime, and the third begins with the spread of the COVID19 pandemic. The list and details of the subperiods for each country are listed in Table 1.

Table 1. The list of studied subperiods for the different countries

Country	Period Number	Currency Pair	Sample period
Morocco	P1	USD/MAD	From 01-01-2003 to 12-01-2018
	P2		From 12-01-2018 to 31-12-2019
	P3		From 01-01-2020 to 30-09-2020
Tunisia	P1	USD/TND	From 01-01-2000 to 31-12-2014
	P2		From 01-01-2015 to 31-12-2019
	P3		From 01-01-2020 to 30-09-2020
South Africa	P1	USD/ZAR	From 01-01-1990 to 31-12-1995
	P2		From 01-01-1996 to 31-12-2019
	P3		From 01-01-2020 to 30-09-2020
Egypt	P1	USD/EGP	From 01-01-2006 to 02-11-2016
	P2		From 03-11-2016 to 31-12-2019

The plot of the closing rates presented in Figure 1 shows essential information about the studied currency pairs' behaviors. The problematic economic context, political instability, and the critical drop in tourist numbers amplified the Tunisian currency depreciation after introducing the flexibility reforms in 2015.

On the other hand, we notice a substantial drop in value for the South African Rand during the last decade due to the US dollar's appreciation consecutive to the Eurozone debt crisis. Moreover, as China is the country's leading economic partner, the Chinese economy's performance frequently impacts South African currency value, as was the case in 2015 with the Yuan devaluation.

Also, we observe a volatile movement for the Moroccan currency guided by the EUR/USD performance. However, since the flexibilization process initiation in 2018, we notice a relatively stable domestic market activity until the COVID19 pandemic in early 2020.

The Egyptian pound plot shows relatively weak fluctuations during the fixed period with a significant spike after the forced switch to float in late 2016 before settling down around its long run equilibrium value.

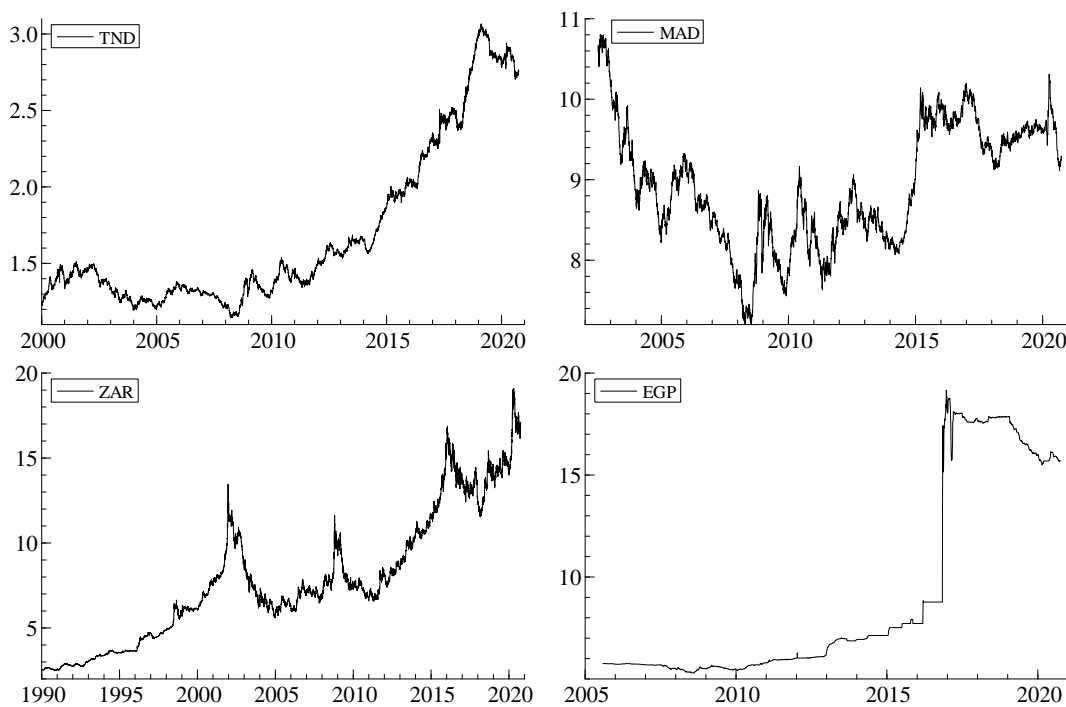


Figure 1. Plot of the studied currency pairs against US Dollar

The descriptive statistics listed in Tables 2 show that Moroccan closing rates are platykurtic and positively symmetric, except for the second period due to the relatively liquid market following the introduction of flexibility reforms in 2018. In Tunisia, we notice that the closing rates are leptokurtic in the First period with a positive asymmetry that translates to a heavy tail in the distribution. This leptokurtic shape may be caused by the central bank's frequent intervention to fix the domestic market's central rate, which created excess volatility in closing rates. The Dinar's series becomes platykurtic in the second and third periods with a persistent asymmetric that switched to negative in the last period. The domestic currency's continuous

depreciation causes this change of sign during the COVID19 pandemic due to the fall in foreign exchange liquidity.

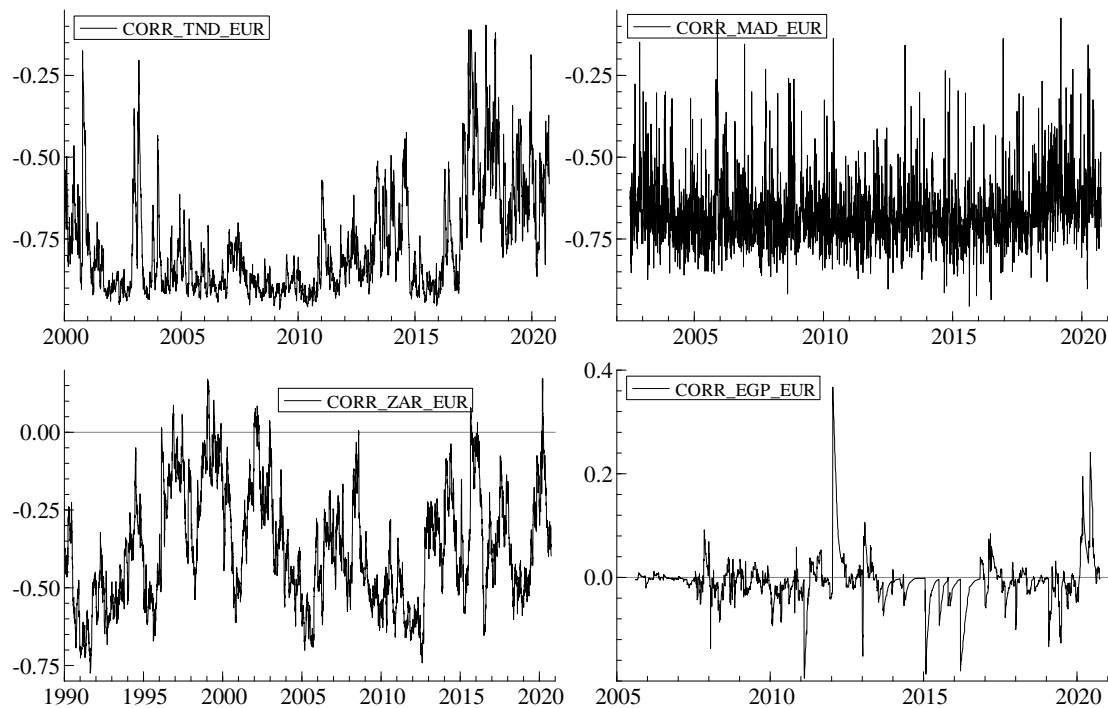


Figure 2. Plot of dynamic correlation for the studied currency pairs with the EUR/USD

The descriptive statistics for four South African Rand listed in Table 3 exhibit a platykurtic and positively asymmetric behavior except during the COVID19 pandemic where asymmetry changed sign. This switch in sign is a result of the commodities demand slowdown mainly from the Chinese economy. In contrast, Egyptian pound statistics show a significant leptokurtic shape during the first two periods and a change in asymmetry sign after the forced transition to a floating regime in 2016. During the COVID19 pandemic, the Egyptian currency displayed a platykurtic and positively asymmetric behavior as the central bank imposed heavy import restrictions to contain exchange rate movements within "reasonable levels".

Table 2. Descriptive statistics for Morocco and Tunisia closing rates over the studied subperiods

	USD/MAD			USD/TND		
	P1	P2	P3	P1	P2	P3
Mean	8.752284	9.503318	9.632533	1.396408	2.414820	2.825049
Median	8.636600	9.539300	9.641650	1.369700	2.399100	2.835300
Maximum	10.24050	9.746800	10.31000	1.866800	3.065700	2.942500
Minimum	7.201750	9.125200	9.110900	1.143400	1.867000	2.703900
Dev Std.	0.701733	0.157914	0.283152	0.143182	0.362931	0.059525
Skewness	0.203301	-0.924243	0.205726	0.841732	0.246425	-0.335969
Kurtosis	2.235428	2.882078	2.787813	3.336615	1.766263	2.060838
Jarque Bera	120.0458	68.75911	61.67880	479.6828	95.89881	10.89045
JB P-Value	0.000000	0.000000	0.031969	0.000000	0.000000	0.004317

Table 3. Descriptive statistics for South Africa and Egypt closing rates over the studied subperiods

	USD/ZAR			USD/EGP		
	P1	P2	P3	P1	P2	P3
Mean	3.109281	8.705798	16.73626	6.239688	17.42282	15.78599
Median	3.062800	7.712500	16.92110	5.746150	17.63300	15.72550
Maximum	3.700000	16.86640	19.09460	8.840000	19.15300	16.13820
Minimum	2.503000	3.621500	14.00640	5.289600	12.99000	15.49570
Dev Std.	0.406162	3.062414	1.320092	0.924608	0.719781	0.156815
Skewness	0.055350	0.678332	-0.384736	1.299026	-1.144812	0.719651
Kurtosis	1.427560	2.397137	2.323776	3.725761	5.118734	2.738816
Jarque Bera	160.9957	574.4119	8.569832	736.7562	251.8003	12.92800
JB P-Value	0.000000	0.000000	0.013775	0.000000	0.000000	0.001559

The stationarity condition is required to exploit the GARCH models for different periods. Thus we use the Augmented Dickey-Fuller test (ADF) to ensure the stationarity of our DATA. The ADF test results listed in Table 4 show the stationarity at the first difference for all the studied series over the different periods. Therefore, the logarithmic first difference of closing rates will be used in the different models to assess the impact of transition steering and COVID19 on domestic forex market behavior.

Table 4. Results of Augmented Dickey-Fuller for our DATA in level and first difference over all the periods of study

Country	Period Number		Level data	1 st difference	Stationarity
USD/MAD	P1	Value	-2.22864	-60.94420	I(1)
		P-Value	0.19620	0.00010	
	P2	Value	-1.73146	-20.20584	I(1)
		P-Value	0.41470	0.00000	
	P3	Value	-2.65783	-34.49590	I(1)
		P-Value	0.66095	0.00200	
USD/TND	P1	Value	0.44445	-72.47193	I(1)
		P-Value	0.98480	0.00000	
	P2	Value	-1.13087	-23.61329	I(1)
		P-Value	0.70550	0.00000	
	P3	Value	-1.253561	-17.77259	I(1)
		P-Value	0.65090	0.00000	
USD/ZAR	P1	Value	-0.64485	-39.11887	I(1)
		P-Value	0.85800	0.00000	
	P2	Value	-1.30016	-81.08138	I(1)
		P-Value	0.63180	0.00010	
	P3	Value	-2.06699	-14.47285	I(1)
		P-Value	0.25840	0.00000	
USD/EGP	P1	Value	1.96001	-49.22238	I(1)
		P-Value	0.99990	0.00001	
	P2	Value	-1.22258	-6.23282	I(1)
		P-Value	0.47550	0.00000	

	P3	Value	-1.832332	-6.95710	I(1)
		P-Value	0.3637	0.00000	

Garch

The GARCH (Generalized Autoregressive Conditional Heteroskedasticity) was introduced by (Bollerslev, 1986) as an extension of the ARCH model. We write the model in the following form:

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^q \alpha_i y_{t-i}^2 + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 \quad (1)$$

Where p and q are positive integers, and $\alpha_0 > 0$, $\alpha_i \geq 0 \forall i \in \{1, \dots, q\}$, $\beta_j \geq 0 \forall j \in \{1, \dots, p\}$. This model is characterized by the β_i coefficient, which represents the impact of past volatility on the current one.

This study will use the GARCH process (1,1) to model conditional volatility in our research. The choice of this p and q value is motivated by many studies in the literature, such as (Hansen & Lunde, 2005), who compare it to 330 GARCH family models and found GARCH(1,1) to be the adequate model to approach conditional volatility of foreign exchange rates. (Miah & Rahman, 2016) and Nugroho (2019) present similar results for stock markets Data.

We express the conditional volatility of GARCH(1,1) as follow:

$$\sigma_t^2 = \alpha_0 + \alpha_1 \cdot y_{t-1}^2 + \beta_1 \cdot \sigma_{t-1}^2 \quad (2)$$

The α_0 is usually interpreted as the minimum volatility, the α_1 as the impact of past shocks and β_1 as the impact of past volatilities. The sum $\alpha_1 + \beta_1$ is used to assess the persistence of volatility over a while.

Figarch

The FIGARCH model (Fractionally integrated generalized autoregressive conditional heteroskedasticity) was first introduced by Baillie et al. (1996) to study long memory processes Deutschmark-U.S. dollar exchange rates between 1979 and 1992. This model was developed as the authors saw that the IGARCH model might be too restrictive as it may yield infinite volatility, which contradicts the observed dynamics of financial series.

We define the FIGARCH(1,d,1) as Follow:

$$\begin{cases} r_t = \mu + \rho r_{t-1} + y_t, & y_t | \psi_t \sim D(0, \sigma_t^2) \\ \sigma_t^2 = \alpha_0 + \{1 - [1 - \beta_1 L]^{-1} (1 - \varphi_1 L) [1 - L]^d\} y_t^2 \end{cases} \quad (3)$$

Where:

μ : An average of the logarithmic yield

y_t : The error terms of the mean equation

ψ_t : Information available in t

d: The fractional integration parameter comprised between 0 and 1, which model long memory behavior and the slow decay of volatility shocks

L: The lag operator

$D(.,.)$: The conditional distribution

Dcc-Garch

The DCC model (dynamic conditional correlations) introduced by (Engle, 2002) presents a matrix of dynamic conditional correlations over time. The estimate is made by computing

conditional volatility for a multivariate GARCH process and then using standardized residues from this model to estimate dynamic correlations. We write the model in the following form:

$$H_t = D_t \Gamma_t D_t \quad (4)$$

Where

$$D_t = \begin{pmatrix} \sqrt{h_{1,t}} & 0 & \dots & 0 \\ 0 & \sqrt{h_{2,t}} & \dots & \vdots \\ \vdots & 0 & \dots & \vdots \\ \vdots & \vdots & \ddots & 0 \\ 0 & 0 & 0 & \sqrt{h_{n,t}} \end{pmatrix} \quad (5)$$

$$h_{it} = \alpha_{0,i} + \sum_{p=1}^{P_i} \alpha_{ip} \epsilon_{i,t-p}^2 + \sum_{q=1}^{Q_i} \beta_{iq} h_{i,t-q} \quad (6)$$

And

$$\Gamma_t = \begin{pmatrix} 1 & \rho_{12,t} & \rho_{13,t} & \dots & \rho_{1n,t} \\ \rho_{21,t} & 1 & \rho_{23,t} & \dots & \rho_{2n,t} \\ \rho_{31,t} & \rho_{31,t} & 1 & \dots & \vdots \\ \vdots & \vdots & \vdots & \dots & \vdots \\ \vdots & \vdots & \vdots & \ddots & \rho_{n-1,n,t} \\ \rho_{n1,t} & \rho_{n2,t} & \dots & \rho_{n,n-1} & 1 \end{pmatrix} \quad (7)$$

The matrix of variances-covariance must be positive and definite, which implies that D_t and Γ_t should also be positive and definite since $H_t = D_t \Gamma_t D_t$. This condition is verified for $D_t = \text{diag}(\sqrt{h_{1,t}}, \dots, \sqrt{h_{n,t}})$ as it is always positive. To verify the condition on Γ_t , we have to check that $0 < \rho_{ij,t} < 1 \forall t$. To do so, we decompose the dynamic correlation matrix into the following form:

$$\Gamma_t = \text{diag}\{Q_t\}^{-1/2} Q_t \text{diag}\{Q_t\}^{-1/2} \quad (8)$$

With $Q_t = (1 - \alpha_{DCC} - \beta_{DCC})\bar{Q} + \alpha_{DCC}\epsilon_{t-1}\epsilon'_{t-1} + \beta_{DCC}Q_{t-1}$, $\text{diag}\{Q_t\}$ and Q_t are matrixes that can be in rewritten the following forms:

$$\text{diag}\{Q_t\}^{1/2} = \begin{pmatrix} \sqrt{q_{11,t}} & 0 & \dots & 0 \\ 0 & \sqrt{q_{22,t}} & \dots & \vdots \\ \vdots & 0 & \dots & \vdots \\ \vdots & \vdots & \ddots & 0 \\ 0 & 0 & 0 & \sqrt{q_{nn,t}} \end{pmatrix} \quad (9)$$

$$Q_t = \begin{pmatrix} q_{11,t} & \sqrt{q_{11,t}}\sqrt{q_{22,t}} & \dots & \sqrt{q_{11,t}}\sqrt{q_{nn,t}} \\ \sqrt{q_{11,t}}\sqrt{q_{22,t}} & q_{22,t} & \dots & \sqrt{q_{22,t}}\sqrt{q_{nn,t}} \\ \vdots & \vdots & \dots & \vdots \\ \vdots & \vdots & \ddots & \vdots \\ \sqrt{q_{11,t}}\sqrt{q_{nn,t}} & \sqrt{q_{22,t}}\sqrt{q_{nn,t}} & \dots & q_{nn,t} \end{pmatrix} \quad (10)$$

The condition of Q_t matrix's definiteness and positivity imply that Γ_t is also definite and positive.

Empirical results

The transition from fixed to intermediary regimes

Table 5. GARCH (1,1) results for the Morocco and Tunisia

		USD/MAD			USD/TND		
		P1	P2	P3	P1	P2	P3
$\alpha_0 10^6$	Coeff	0.00376	0.09557	0.16743	0.10509	0.09278	2.31903
	p-value	0.06834	0.03229	0.05024	0.04400	0.01470	0.02150
α_1	Coeff	0.01145	0.03284	0.10889	0.03004	0.10102	0.17753
	p-value	0.06840	0.02890	0.00000	0.00000	0.00070	0.00080
β_1	Coeff	0.98581	0.95162	0.79158	0.96563	0.87749	0.74246
	p-value	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
$\alpha_1 + \beta_1$		0.99727	0.98447	0.900479	0.99567	0.97852	0.92000
Log-likelihood		3020.23	2228.22	793.26	10338.30	4855.69	729.62

Table 6. FIGARCH (1,d,1) results from Morocco and Tunisia

		USD/MAD			USD/TND		
		P1	P2	P3	P1	P2	P3
$\alpha_0 10^6$	Coeff	0.04260	0.08424	0.17089	0.25334	0.66391	0.87984
	p-value	0.01201	0.06160	0.04790	0.01759	0.02805	0.02610
α_1	Coeff	0.04022	0.36405	0.16337	0.46852	0.48523	0.03100
	p-value	0.01789	0.00740	0.01375	0.00090	0.00120	0.00836
β_1	Coeff	0.95227	0.78146	0.86289	0.85492	0.71052	0.73421
	p-value	0.00000	0.00000	0.00000	0.00000	0.00090	0.00000
d	Coeff	0.90765	0.45730	0.98618	0.51687	0.43447	0.93996
	p-value	0.00000	0.03990	0.00000	0.01880	0.01560	0.00000
Log-likelihood		15748.80	2228.73	1163.04	15204.00	4868.33	1132.72

Table 7. DCC GARCH (1,1) results for the interdependence with EUR/USD pair for Morocco and Tunisia

		USD/MAD			USD/TND		
		P1	P2	P3	P1	P2	P3
ρ_{dcc}	Coeff	0.02438	0.42448	0.67928	0.85418	0.64516	0.60675
	p-value	0.05663	0.00000	0.00000	0.00000	0.00020	0.00000
α_{dcc}	Coeff	0.08781	0.07146	0.13853	0.07301	0.03210	0.20330
	p-value	0.00000	0.02070	0.00146	0.00000	0.00260	0.01400
β_{dcc}	Coeff	0.91188	0.68472	0.53385	0.89243	0.96512	0.31787
	p-value	0.00000	0.00000	0.00000	0.00000	0.00000	0.03340
Log-likelihood		38088.20	4295.24	1543.11	21965.60	10380.30	1523.37

The results of GARCH Models for Morocco and Tunisia listed in Table 5 exhibit a sharp rise in the impact of shocks and a decrease in past volatility impact for both countries after the start of the flexibilization process. However, the magnitude of those changes is significantly more prominent in Tunisia, which can be related to the problematic context surrounding this transition. As a matter of fact, a condition to complete its fourth review and give the country access to USD220M loan, the IMF strongly required Tunisia to introduce significant flexibility reforms to contain high external and fiscal deficits and anchor inflationary expectations. On the other hand, Morocco started its flexibilization process smoothly with a stable and liquid market. The restrictions imposed by the central bank on contracting hedging instruments

contributed to defuse the panic movement observed in the second quarter of 2017, which has impacted negatively foreign exchange reserves.

That said, those changes can be interpreted as a switch in market players' behavior as they become more sensitive to shocks than volatilities. Commercial banks, which dominate the market pool in both countries, gain more leeway to adjust market prices according to their positions and anticipations while being increasingly sensitive to shocks, especially those related to liquidity compared with the fixed exchange regime Period. The FIGARCH model results in Table 6 confirm this behavior change.

The fractional integration parameter used as a metric for the extended memory process decreased in both countries, especially in Morocco, where it lost approximately half its value. This contrasted magnitude is justified because the Central Bank of Morocco (BKAM) is adopting a fully disclosed peg that allows the market actors to anticipate domestic currency movements within the very narrow bands ($\pm 0,3\%$) based on EUR/USD fluctuations. Contrarily, Tunisian central uses an undisclosed peg that is adjusted frequently to target its real exchange rate targets. This configuration amplifies uncertainty for the domestic forex market, as shown by the low fractional parameter value during the first Period in Tunisia.

Concerning the interdependence with the international market, the conditional correlation results listed in Table 7 exhibit conflicting behavior in the two countries following the transition. While we observe a significant drop in Morocco's dynamic correlation after the change, the Tunisian market shows an increasing interdependence with the international market. Two main elements explain these contradicted results; :the contrasted context in which the flexibilization process was conducted and the central bank high frequency intervention in the domestic exchange rate market. As shown previously, the commercial banks dominating the Moroccan market were relying exclusively on EUR/USD movements during the fixed period until 2018, which yielded the high fractional integration parameter. Therefore, as the transition process went on smoothly, and the market began the self-adjusting mode gradually to the offer and demand mechanism, the international market's connection began to recede. Also, endogenous factors such as domestic market liquidity started to take growing importance in the price discovery process.

Meanwhile, the Tunisian transition was conducted in a harsh economic context with a domestic currency already in free fall. Moreover, as the Tunisian central bank was frequently intervening in the forex market during the first period, interdependence with the international market may have been relatively diminished, as suggested by many studies in the literature such as (Dominguez & Frankel, 1993) and (Bonser-Neal, 1996). This kind of intervention substantially impacts exchange market volatility, especially if the market's participants anticipate them.

During the Third Period, where the COVID19 pandemic impacted both countries significantly, we observed much change in domestic markets, such as a sharp rise in shocks' impact due to the European lockdowns and sharp economic slowdown. Western Europe is a primary economic and tourist partner for both countries; therefore, the drop in the external demand for goods and services and the multiple lockdowns heavily hurted Morocco and Tunisia economies. They distorted the liquidity of domestic forex markets. This fall in foreign currency volumes contributed to the critical drop in past volatilities and the interdependence with the international market as local banks managed to absorb the shocks without putting pressure on the official foreign exchange reserves.

Both central banks attempted to diffuse this stress using currency swaps with domestic banks and boosting the money market liquidity by lowering the discount rate (-50bps for Morocco and -100bps for Tunisia) and reducing the mandatory requirements. That said, we notice an

immediate increase in the fractional integration parameter as fear and uncertainty crippled the domestic market. Moreover, market actors became very sensitive to recent crisis episodes in constructing their prices and anchoring their anticipations.

The transition from fixed to floating regimes

Table 8. GARCH (1,1) results for the South Africa and Egypt cases

		USD/ZAR			USD/EGP		
		P1	P2	P3	P1	P2	P3
$\alpha_0 10^6$	Coeff	0.30289	0.00244	0.16807	0.37593	0.38612	1.23002
	p-value	0.00935	0.03980	0.07444	0.01444	0.00438	0.00370
α_1	Coeff	0.04936	0.08105	0.10059	0.08023	0.20612	0.33179
	p-value	0.00000	0.00000	0.05741	0.03655	0.00000	0.03600
β_1	Coeff	0.84062	0.90276	0.77763	0.61557	0.77991	0.52519
	p-value	0.00000	0.00000	0.01654	0.00000	0.02080	0.02489
$\alpha_1 + \beta_1$		0.889990	0.98382	0.87823	0.695820	0.77379	0.85698
Log-likelihood		6722.24	20569.20	598.85	8792.04	2750.13	1191.30

Table 9. FIGARCH (1,d,1) results for South Africa and Egypt cases

		USD/ZAR			USD/EGP		
		P1	P2	P3	P1	P2	P3
$\alpha_0 10^6$	Coeff	0.24435	0.00571	0.09987	0.35972	0.01056	0.38094
	p-value	0.01551	0.02336	0.02937	0.01673	0.01549	0.00336
α_1	Coeff	0.28508	0.21226	0.05713	0.09373	0.10549	0.27252
	p-value	0.00740	0.00000	0.00261	0.03470	0.03896	0.00000
β_1	Coeff	0.71502	0.64627	0.67754	0.83552	0.77002	0.62220
	p-value	0.00000	0.00000	0.04433	0.00000	0.04353	0.01607
d	Coeff	0.65300	0.53720	0.32380	0.88184	0.94294	0.50317
	p-value	0.00060	0.00000	0.0041	0.02990	0.00000	0.05520
Log-likelihood		6727.54	20581.30	829.90	5646.03	2533.16	1052.27

Table 10. DCC GARCH (1,1) results for the interdependence with international market pair for South Africa and Egypt cases

		USD/ZAR			USD/EGP		
		P1	P2	P3	P1	P2	P3
ρ_{acc}	Coeff	0.55093	0.30104	0.26550	0.00554	0.07741	0.23437
	p-value	0.00000	0.00410	0.03430	0.06202	0.03080	0.08270
α_{acc}	Coeff	0.03895	0.02386	0.01935	0.04849	0.03667	0.08047
	p-value	0.00000	0.00010	0.02310	0.02445	0.02087	0.01137
β_{acc}	Coeff	0.91743	0.97045	0.94962	0.89369	0.80561	0.70953
	p-value	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
Log-likelihood		12619.00	44706.50	1386.51	18997.90	4827.72	1314.62

The GARCH Model results for South Africa and Egypt listed in Table 8 exhibit significant growth in shocks impacts in both countries after the transition to floating in the second period. Those changes translate to a more flexible forex market in both countries than Morocco and Tunisia, where fluctuations bands limit exchange rate variation. However, this type of exchange rate regime amplified the domestic market's exposition to both exogenous and endogenous shocks, especially in Egypt, where the black market is endemic for the whole economic system. The significant shocks' frequency increased the domestic market

responsiveness to historical volatilities, translating a rise in past volatilities impact. That said, the amplitude of those changes is more remarkable for the Egyptian case as the country was forced to switch to floating in the aftermath of a severe currency crisis.

The FIGARCH model results showed in Table 9 add more information on the change in domestic forex market behavior as we observed conflictual results after the transition to floating. The first observation is the higher fractional integration parameter in Egypt in comparison to South Africa. This difference in amplitude may result from the strict capital control adopted by the Egyptian monetary authorities and the central bank's frequent intervention in the domestic forex market during this period, which may have amplified the long memory process.

After the forced transition to floating, we notice an increase in the Egyptian case's fractional integration parameter as the monetary authorities failed to convince market participants of the credibility of its policy. In contrast, the FIGARCH results showed a decreasing long memory process in South Africa after switching to float, proving the maturity of the regime transition choice and the consistency of its monetary discipline.

Concerning the interdependence with the international market, the conditional correlation results listed in Table 10 exhibit differentiated patterns in the two countries following the transition to floating in the second period. First, we observe that the interdependence relationship increased slightly for South Africa after going to the floating regime due to Rand's status as a commodity currency, explaining the strong correlation with the international market movements and South Africa's main partners' business cycles. On the other hand, we notice a decrease in interdependence with the global market as the Egyptian forex market actors gained more autonomy after the Egyptian pound's abrupt depegging. The parallel market's links to the Egyptian economy may have also distorted this relationship as official prices do not necessarily reflect accurate price information.

As the COVID19 pandemic hit the global economy, we observe a further rise in shocks' impact and a more pronounced decrease in the domestic forex market sensitivity to past volatility. This change's amplitude is more pronounced in the Egyptian case as its grim economic outlook further worsens due to a fall in demand for raw materials and the collapse of the tourism sector. We also observe a "sharp fall" in the interdependence with the international market and the extended memory process thanks to the monetary authorities' bold actions during the COVID19 crisis.

Those policies included significant capital movements restrictions to avert foreign reserve depletion and consecutive cuts in the discount rate (300 bpts decrease and then and another 50 BPS in a matter of three months after the start of COVID19 crisis) to alleviate monetary market liquidity stress. Meanwhile, the economic fallout of lockdowns significantly impacted the South African forex market as a drop in global demand in Europe, and China affected its balance of trade. That said, the central bank's monetary policies relatively contained shocks' impact compared to Egypt. Moreover, the monetary authorities helped the South African market absorb excessive volatility, contributing to the critical drop in the extended memory process during the last period.

Conclusion

In this study, we investigated the impacts of transition process steering and the COVID19 pandemic on domestic forex market behavior. To do so, we conducted a comparative analysis based on the case of four African countries which adopted different transition paths from fixed to intermediary and/or floating regimes. Our main result is that the steering of the transition and the country's economic context significantly impact the domestic forex market. We found

that a smooth and gradual transition allows for a better adaptation of the different domestic market actors, resulting in superior efficiency in regulating liquidity and absorbing shocks than countries with forced regime switch. The forced transition in Tunisia and Egypt was further complicated by adverse factors such as persistent political instability, poor macroeconomic performance, and weak fiscal and monetary discipline to tackle the chronic public deficits and inflationary pressures. Their domestic forex markets' main feature was the amplification of shocks that far exceeded the other countries' level with smooth transition mode. We also notice that the development of the financial sector and the successful integration in the global economy may help reduce the impact of shocks and promote efficiency of the domestic market. Concerning the impact of the COVID19 pandemic on the domestic forex markets, we observe a sharp rise in shocks' impact due to the global slowdown and liquidity squeeze, especially for countries with strict capital control policies. Moreover, we notice a more significant fallout of the pandemic on countries where the regime transition was abrupt as the domestic forex market actors become more sensitive to endogenous volatility and shocks. These results have three major policy implications: (i) the transition process's steering should be flexible and inclusive to allow the domestic market participants to embrace the new regime's different components. (ii) The central banks should adopt transparent and open monetary policies to maintain a stable and efficient domestic forex market, especially in a forced exchange regime change. (iii) A poor steering of the transition process may increase the domestic forex market vulnerability in the case of a major crisis, as was the case with the COVID19 pandemic. Finally, as our study focused only on domestic forex market behavior, further studies should investigate macro and microeconomic aggregates behavior during the transition process with different steering modes, especially in a significant crisis COVID19.

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