An Empirical Analysis of Monetary Policy and Financial Market Interlinkages in Tunisia Using Advanced Connectedness Approaches: Evidence from TVP-VAR and QVAR Models

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1 Introduction

Fundamental research (Estrella & Hardouvelis (1991), Mishkin (1990), Bernanke & Blinder (1992) shows that when central banks change key rates, they mainly affect short-term interest rates, which in turn influence long-term rates through expectations. More recent studies (Gagnon et al. (2011), Vayanos & Vila (2009); He & Krishnamurthy (2013), etc.) highlight that this transmission is unstable and context-dependent, especially under uncertainty.

Research Goal

This study examines how changes in Tunisia's monetary policy rate are transmitted to long-term interest rates in the financial market, highlighting the strength and effectiveness of the monetary policy transmission mechanism in a heterogeneous and uncertain environment. It provides two main contributions:

- examining monetary policy transmission in a transitioning emerging economy
- employing advanced connectedness methods, TVP-VAR and QVAR, to capture both time-varying and nonlinear nature of financial interconnectedness.

2 Methodology

- We analyze monthly data from 2004 to 2024 for four key Tunisian interest rates: the central bank key rate (TD), the interbank monthly average rate (TMM), as well as the 1-year and 10-year government bond yields.
- Mean values indicate an upward-sloping yield curve, with long-term rates higher than short-term rates.
- The 1Y yield shows the highest variance.
- Non-normality, autocorrelation and conditional heteroskedasticity are present, justifying the use of TVP-VAR and QVAR models.

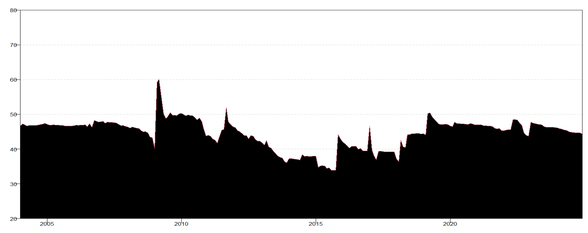
Table 1 : Summary statistics

	TD	TMM	1Y	10Y
Mean	5.443	5.504	5.827	7.814
Variance	1.78	1.776	2.283	1.655
Skewness	0.705	0.673	0.900	0.959
Ex.Kurtosis	-0.673	-0.717	-0.526	-0.189
	(0.002)	(0.000)	(0.032)	(0.633)
JB	25.651***	24.417***	36.918***	39.037***
	(0.000)	(0.000)	(0.000)	(0.000)
ERS	-0.240	-0.529	0.664	-1.006
	(0.810)	(0.598)	(0.507)	(0.316)
Q(20)	2051.438***	2001.525***	2033.067***	1576.072***
	(0.000)	(0.000)	(0.000)	(0.000)
Q2(20)	1988.821***	1974.453***	1943.431***	1436.117***
	(0.000)	(0.000)	(0.000)	(0.000)

3 Results

Time-Varying Parameter VAR Approach (TVP-VAR)

Figure 1: Dynamic Total Connectedness

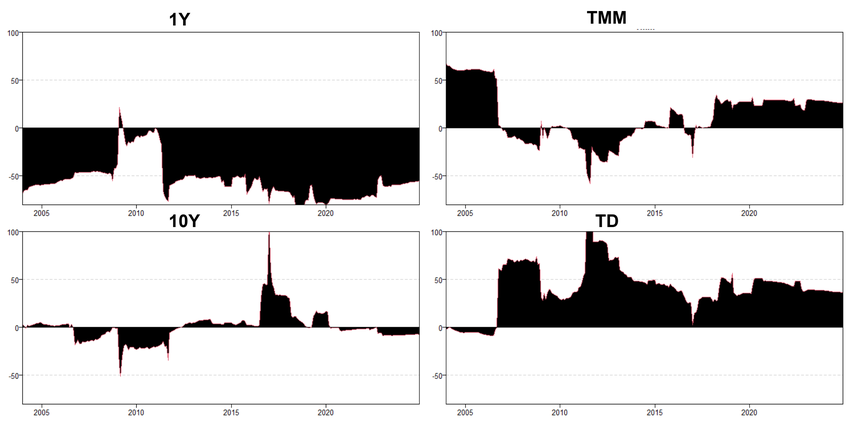


Black area represents the symmetric total connectedness.

Table 2: Averaged connectedness table

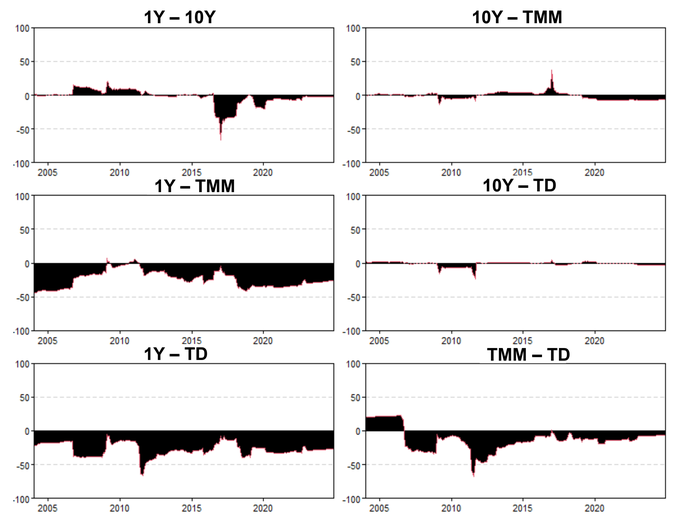
	1Y	10Y	TMM	TD	FROM
1Y	26,5	13,3	28,4	31,9	73,5
10Y	10,7	81,7	5,1	2,5	18,3
TMM	4,2	3,9	48,8	43,1	51,2
TD	4,1	1,2	30,2	64,5	35,5
TO	18,9	18,4	63,7	77,4	178,5
Inc.Own	45,4	100,2	112,5	142,0	cTCI/TCI
NET	-54,7	0,2	12,5	42,0	**59,5/44,6**
	0,000	0,001	0,002	0,003	

Figure 2 : Dynamic Net Total Dynamic Connectedness



The vertical axis captures the net influence of each variable, where values above zero indicate that a variable is a **net transmitter** of shocks to the system, and values below zero denote a **net recipient** of shocks..

Figure 3 : Dynamic Net Pairwise Directional Connectedness



Values above zero indicate that the variable listed first is **a net transmitter**, and values below zero indicate that it is a **net receiver**.

Quantile Connectedness Vector Autoregression (QVAR)

Figure 4: Dynamic Total Connectedness (all rates)

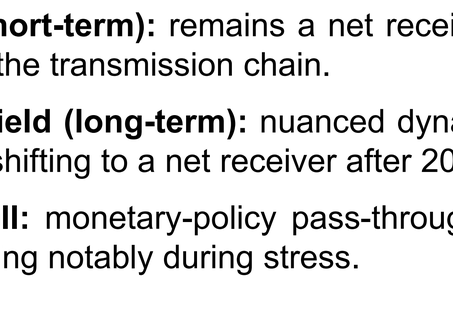
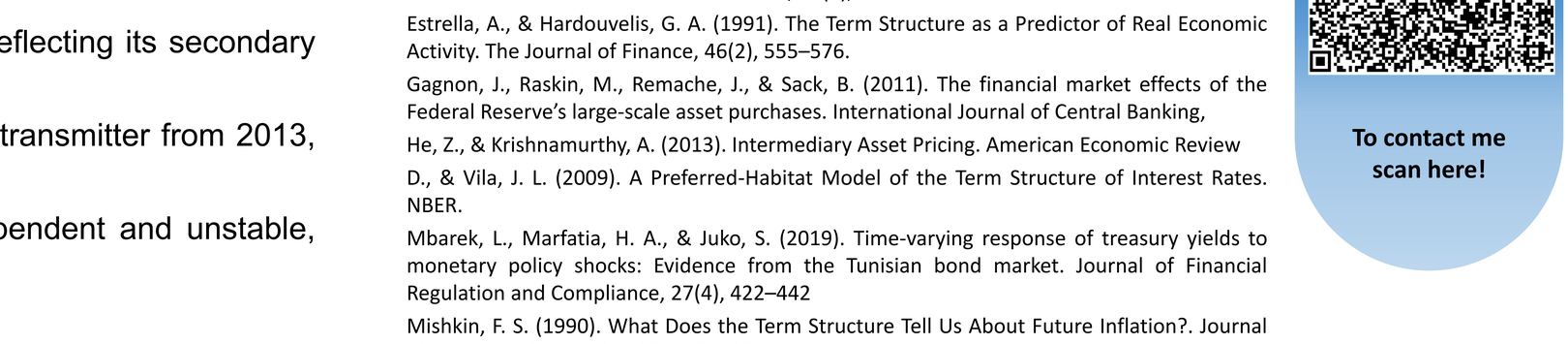


Figure 4 shows the evolution of connectedness over time and across quantiles. Yellow areas indicate **weak connectedness** during stable periods, while red and dark red areas reflect **stronger spillovers** during stress or high-uncertainty periods.

Figure 5: Net Quantile Directional Connectedness



Blue shades indicate periods when the rate acted as a **net receiver** of shocks, while red shades reflect periods of **net transmission**

4 Conclusion

•**Connectedness approaches:** Connectedness varies across regimes and spikes during stress, as shown by TVP-VAR around the post-2011 transition, the 2016 liquidity tightening, and the post-COVID period, while QVAR confirms low connectedness in normal times with TCI peaking in extreme states

•**TD (key rate):** a consistent net transmitter of shocks, confirming its leading role over short-term market rates.

•**TMM (interbank rate):** evolves from a passive receiver to an active transmitter in recent years.

•**1Y (short-term):** remains a net receiver of shocks, reflecting its secondary role in the transmission chain.

•**10Y yield (long-term):** nuanced dynamics, mainly a transmitter from 2013, 2019, shifting to a net receiver after 2021.

•**Overall:** monetary-policy pass-through is regime-dependent and unstable, tightening notably during stress.

•**Policy implication:** strengthen transmission when needed via targeted asset purchases and clear forward guidance to anchor expectations.

•**Key takeaway:** effective policy design must account for time variation and distributional asymmetries in connectedness to calibrate interventions.

5 References

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