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The role of monetary policy in economic crises: the case of Tunisia

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Introduction

- Taking into account the mouvements of stocks through time.
- The ommission of these stocks from a model may lead to false predictions of the consequences of policy changes or exogenous shocks to the system.
- The SFC model was created to prevent this kind of problem.
- This model aims at achieving realism and approximation between modeling and the actual functioning of the economy.

Outline



Six sectors constitute our economy firms, government, Central Bank, private banks, households and rest of world.

Figure 1: Major links between Tunisia and the European Union, 2008



Sources: Tunisian authorities and FMI services estimations

Table 1: Transaction matrix

		firms									Rest of	
	government			household	Private ba	ank	Central b	ank	Σ		the	ΣΣ
-											world	
Consumption		+C		-C					0			0
Government expenditure	-G	+G _f		+ G _h					0			0
Investiment		+	-1						0			0
wages		-W		+W					0			0
taxes	+T	-T _f		-T _h					0			0
Interest on treasaury bills	-i _{b-1} B ₋₁				+i _{B-1} B ₋₁				0			0
Interest on loans		-i _{L-1} L ₋₁			i _{L-1} L ₋₁				0			0
Interest on bank deposits				+I _{d-1} D ₋₁	-I _{d-1} D ₋₁				0			0
Intérêt on CB advances					-i _{cb-1} REF		+i _{cb} REF		0			0
Interest in foreign Ioan		-i _{L-1} L ₋₁ € / xr							0	xr	+i _{I-1} L€ ₋₁	0
Profit of firms		-P _E	+P _E						0			0
Profit of banks					-P _b	+P _b			0			0
Profit of CB	+P _{cb}						-P _{cb}		0			0
Δ HPM						-∆H		+∆H	0			0
Δ treasaury bills	+∆B					-ΔB			0			0
Δ loans			+∆L			-ΔL			0			0
Δ bank deposits				-ΔD		+∆D			0			0
Δ CB advances						+∆REF		- ∆REF	0			0
Δ foreign loans			+∆L€/xr						0	xr	-∆L€	0
Import		-IM							0	xr	+IM	0
Export		+X							0	xr	- X	0
Σ	0	0	0	0	0	0	0	0	0	0	0	0

Table 2: Balance sheet matrix

	Govenment	firms	household	Private banks	Central bank	Rest of the world	Σ
capital		+K					К
High powerd				+H	-H		
money							0
Treasaury bills	-В			+B			0
loans		-L		+L			0
Foreign loans		-L€				+L€	0
Bank deposits			+D	-D			0
CB advances				-REF	+REF		0
Net wealth	-В	+v _f	D	+V _b	0	+L€	+K

Accounting identities

- (i) G + $i_{b-1}B_{-1} \equiv P_{cb} + \Delta B + T$
- (ii) W + $i_{L-1}L_{-1} + i_{L-1} + k_{L-1} + k_{L-1}$
- (iii) $I \equiv \Delta L + \Delta L^{\notin}/xr + P_{E}$
- (iv) C + T_M + $\Delta D \equiv W + i_{d-1}D_{-1} + G_M$
- (v) $i_{L-1}L_{-1+} i_{B-1}B_{-1} \equiv i_{d-1}D_{-1} + P_{b+1} i_{cb-1}REF$
- (vi) $\Delta H + \Delta B + \Delta L \equiv \Delta D + \Delta REF + P_{b}$
- (vii) $P_{cb} \equiv i_{cb-1} REF$
- (viii) $\Delta H \equiv \Delta REF$
- (ix) $i_{I-1}L^{\epsilon}_{-1} + IM \equiv \Delta L^{\epsilon} + X$
- $G \equiv G_E + G_M$
- $T \equiv T_E + T_M$

Behavioral equation



Figure 2: structure of external debt

Sources: Tunisian authorities and FMI services estimations

Rest of the world

- In pm = $v_0 v_1 \cdot \ln xr + (1 v_1)$. In pd + v_1 . In pd €
- Inpx = χ_0 χ_1 . In xr + (1 χ_1). In pd + χ_1 .In pd€
- Ln IMR = $a_0 a_1$. (In pm $_{-1} \ln p_{d-1}$) + $a_2 \ln YR$
- Ln XR = $\kappa_0 \kappa_1$. (In pm^{\in_{-1}} In p_{d-1}^{\in}) + κ_2 In YR \in
- IM = IMR · pm
- $X = XR \cdot px$
- IM€ = X . xr
- X€ = IM . Xr

Pm : import prices Px : export prices Xr : exchange rate Pd : domestic prices

Government

Direct taxes by sectors

year		2001	2002	2003	2004	2005	2006	2007	2008
Direct taxes	Firms	569.5 (30.33%)	686.7 (33.30%)	744.4 (33.33%)	798.9 (32.62%)	1186.9 (40.15%)	1192.4 (37.2%)	1488.9 (39.4%)	2081.1 (44.9%)
	Financial institutions	97.1	60.8	58.3	59.3	61.2	72.7	84.8	109.3
	government	33 .9	33.9	33.7	33.9	35.1	35.0	34.1	35.8
	household	1150.8 (61.30%)	1273.5 (61.12%)	1373.5 (61.58%)	1529.4 (62.43%)	1624.9 (54.97%)	1864.1 (58.16%)	2093.7 (55.5%)	2320.2 (50.1%)
	Rest of the world	25.8	23.4	20.3	28.3	47.6	40.6	70.1	84.3
TOTAL		1 877.1	2078.5	2230.2	2449.7	2955.5	3204.7	3771.5	4630.8

Indirect taxes by sectors

year	2001	2002	2003	2004	2005	2006	2007	2008	
	Firms	2162.8	2230.0	2295.9	2462.5	2639.3	2766.6	2974.2	3401.8
Indirect									
taxes	Finacial institutions	88.4	94.2	108.6	119.4	135.1	147.2	168.1	185.7
	government	13.5	10.1	10.1	10.7	12.3	13.3	13.2	13.1
	household	421	403.8	415.3	445.9	477.3	528	660	710.8
	Good and services	1630.5	1541.4	1536.5	1737.1	1688.1	1755.7	1909.9	2368.5
TOTAL		4316.4	4279.4	4363.3	4775.6	4952.1	5210.7	5725.5	6680.0



Government

Public deficit

year	2005	2006	2007	2008	2009
Public deficit	3.2	2.8	2.9	1.1	3.8

• DG = G + (ib-1 . B-1) - T – Pcb

Treasury bills

années	1999	2000	2001	2002	2003	2004	2005	2006	2007
BTA	696	922	630	754	1039	1916	1137	1010	945
BTCT	759	1600	1880	1719	1084	680	494	485	543

• B ≡ B-1 + DG

• ib = icb

Firms

The share of savings collected from financial market in the domestic saving and investment

Années	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
APE/EN (%)	2.8	13.6	14	8.3	10.1	3.8	28.7	25.3	23.8	21.6	22.5	25.9	22.8
APE/	2.2	11.3	11.6	8.1	9.6	3.5	27.2	29.7	29.5	27.1	20.5	25.1	21.6
FBCF (%)													

APE is saving collected by financial market

EN is the domestic saving

[3] FBCF measured the investment

- K =K_{-1 +} I
- $\operatorname{gr}_{\mathsf{K}} = \gamma_{0+} \gamma_1 r_{\mathsf{CF}-1} + \gamma_2 U_{-1} \gamma_3$ lev il

 $\begin{array}{l} \gamma_0 : \text{state of confidence} \\ r_{CF-1} : \text{rate of cash flow} \\ U_{-1} : \text{capacity utilization rate} \\ \text{lev: leverage} \end{array}$

Households

•
$$C = \alpha_1 \cdot Y_w^a + \alpha_2 D_{-1}$$

• $Y_w^a = Y_{W-1} + \theta_h (Y_{W-1} - Y_{W-1}^a)$
• $Y_w = W - T$

 $Y_{w}^{\ a\,:}$ expected disposble income

D: wealth

 $\Theta_{h\,:}$ speed of adjustment in expectations

Private banks

- $P_b \equiv i_{B-1} B_{-1} + i_{L-1} L_{-1} i_{b-1} REF i_{d-1} D_{-1}$
- $i_1 = i_{cb} + 3_1$
- $i_{d} = i_{cb} 3_2$

Central Bank

- $H = \eta \cdot D$
- $P_{cb} \equiv i_{cb-1}$. REF-1
- REF = REF-₁ + Δ H + Δ B + Δ L Pb Δ D
- $\triangle \mathsf{REF} \equiv \triangle \mathsf{H}$

Part 2: Simulation



Graphique 1: lower rate of growth in Europe. Effects on growth rate, public expenditure, exports and public deficit.



Graphique 2: lower interest rate. Effects on growth rate, public expenditure, exports and public deficit.



Conclusion

- Our attempt to model the Tunisian economy from a post-Keynesian approach has established our framework with reference to studying the impact of various economic shocks on economic activity.
- We found out that growth shocks in the major EU partners of Tunisia have relatively large effects on growth in Tunisia. These shocks are transmitted primarily through the export channel.
- The results indicated that the recession of 2008 in the E. U. presents significant risks for Tunisia. Faced with this crisis, Tunisia has acted through its monetary policy through its interest rate (down 75%), which allows the recovery of its economic growth.