

SFC FR Model

A Stock Flow Consistent model for the French economy.

System of equations and simulations

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Table of contents

System of equations	1
Non-financial corporations	9
Households and NPISH	11
Financial institutions.....	13
Financial institutions, other than the central bank	14
Banque de France	16
Government	18
Rest of the world	20
Prices, wages, employment and interest rates	22
Exogenous parameters and variables	24
Simulations	24
Observed vs simulated	24
Scenarios	29

System of equations

Throughout the presentation, terms in bold indicate that the corresponding term is a single variable included in the code. For instance, pv (a value) indicates that p (price) and v (volume) are separate terms, whereas **pv** is a single value item. When this is done, an additional identity $v = \mathbf{pv}/p$ (or alternatively $p = \mathbf{pv}/v$) is added to the code. In order to save space, these equations are not shown in the document. In this version, the items belonging to the production account (other than value added) are taken as given, so that the supply side is not modeled. The variables p_{12}^G , I_{12}^G , p_{13}^H and I_{13}^H are exogenous.

Table 1 Symbolic balance sheet structure of economic agents

		Non-Fin. Corporations		Financial institutions				Government		Households + NPISH		Rest of the world	
				Banks		Banque de France							
		Asset	Liab.	Asset	Liab.	Asset	Liab.	Asset	Liab.	Asset	Liab.	Asset	Liab.
ANF ₁	Produced non-financial assets	$p_{K_1}^F K_1^F$		$p_{K_1}^B K_1^B$				$p_{K_1}^G K_1^G$		$p_{K_1}^H K_1^H$			
ANF ₁₂	Inventories (12) + valuables (13)	$p_{K_{12}}^F K_{12}^F$						$p_{K_{12}}^F K_{12}^F$		$p_{K_{12}}^F K_{12}^F$ $p_{K_{13}}^F K_{13}^F$			
ANF ₂	Non-produced non-financial assets	$p_{K_2}^F K_2^F$		$p_{K_2}^B K_2^B$				$p_{K_2}^G K_2^G$		$p_{K_2}^H K_2^H$			
F ₁	Monetary gold and SDRs					$p_G^{CB} G^{CB}$							$p_G^{CB} G^{CB}$
F ₂	Bills and coins	H^F		H^B			H			H^H		H^R	
	Refinancing between financial institutions				RF	RF^{CB}							RF^R
	Bank reserves			RES			RES						
	Govt. account at CB						D_L^{CBG}	D_A^{CBG}					
	Target 2						$TRGT2$						$TRGT2$
	Deposits	D_A^F		D_A^B	D_L^B	D_A^{CB}	D_L^{CB}	D_A^G	D_L^G	D_A^H		D_A^R	D_L^R
F ₃	Public securities	$p_{B_A}^{FG} B_A^{FG}$		$p_{B_A}^{BG} B_A^{BG}$		$p_{B_A}^{CBG} B_A^{CBG}$			$p_{B_L}^G B_L^G$			$p_{B_A}^{RG} B_A^{RG}$	
	Foreign securities	$p_{B_A}^{FR} B_A^{FR}$		$p_{B_A}^{BR} B_A^{BR}$		$p_{B_A}^{CBR} B_A^{CBR}$		$p_{B_A}^{GR} B_A^{GR}$		$p_{B_A}^{HR} B_A^{HR}$			$p_{B_L}^R B_L^R$
	Other securities		$p_{B_L}^F B_L^F$	$p_{B_A}^B B_A^B$	$p_{B_L}^B B_L^B$	$p_{B_A}^{CB} B_A^{CB}$		$p_{B_A}^G B_A^G$		$p_{B_A}^H B_A^H$		$p_{B_A}^R B_A^R$	
F ₄	Loans	L_A^F	L_L^F	L_A^B		L_A^{CB}			L_L^G		L_L^H	L_A^R	L_L^R
F ₅	[Domestic] Equity and inv. fund shares	$p_{E_A}^{F_{FR}} E_A^{F_{FR}}$	$p_{E_L}^F E_L^F$	$p_{E_A}^{B_{FR}} E_A^{B_{FR}}$	$p_{E_L}^B E_L^B$	$p_{E_A}^{CB_{FR}} E_A^{CB_{FR}}$	$p_{E_L}^{CB} E_L^{CB}$	$p_{E_A}^{G_{FR}} E_A^{G_{FR}}$		$p_{E_A}^{H_{FR}} E_A^{H_{FR}}$		$p_{E_A}^R E_A^R$	
	[Foreign] Equity and inv. fund shares issued by RoW	$p_{E_A}^{F_R} E_A^{F_R}$		$p_{E_A}^{B_R} E_A^{B_R}$		$p_{E_A}^{CB_R} E_A^{CB_R}$		$p_{E_A}^{G_R} E_A^{G_R}$		$p_{E_A}^{H_R} E_A^{H_R}$			$p_{E_L}^R E_L^R$
F ₆	Insurance, pension funds and s.g.s.	A_A^F			A_L^B			A_A^G		A_A^H		A_A^R	
F ₇	Fin. derivatives and employee stock options	X_A^F			X_L^B			X_A^G		X_A^H			X_A^R
F ₈	Other accounts receivable/payable	Z^F		Z^B		Z^{CB}		Z^G		Z^H		Z^R	
F	Financial wealth		FW^F		FW^B		FW^{CB}		FW^G		FW^H		FW^R
B90	Net worth		$WLTH^F$		$WLTH^B$		$WLTH^{CB}$		$WLTH^G$		$WLTH^H$		$WLTH^R$

Closes the column (sector) in flow

Closes the row (instrument) in flow

The unwritten identity is described in Equation 271.

The closure for the government is the sector's total indebtedness ($p_{B_L}^G B_L^G + L_L^G$), described in Equation 323

Table 2 Numerical balance sheet structure of economic agents, 2019 % of GDP

		Non-Fin. Corporations		Financial institutions				Government		Households + NPISH		Rest of the world		Total
				Banks		Banque de France								
		Asset	Liab.	Asset	Liab.	Asset	Liab.	Asset	Liab.	Asset	Liab.	Asset	Liab.	
ANF ₁	Produced non-financial assets	105.8		6.9				52.3		169.2				334.2
ANF ₁₂	Inventories (12) + valuables (13)	17.5						1.1		6.5				25.1
ANF ₂	Non-produced non-financial assets	93.7		7.4				38.6		169.3				309.0
F ₁	Monetary gold and SDRs					4.3						4.3	0.0	
F ₂	Bills and coins	0.6		0.5			10.2			3.4		5.6	0.0	
	Refinancing between financial institutions				-7.9	5.0						12.9	0.0	
	Bank reserves			22.2			22.2						0.0	
	Govt. account at CB						1.1	1.1					0.0	
	Target 2					1.3						1.3	0.0	
	Deposits	28.3		97.4	207.0	7.5	6.7	6.0	5.8	64.6		63.5	47.8	0.0
F ₃	Public securities	1.2		22.1		17.4			98.1			57.4	0.0	
	Foreign securities	1.6		63.3		6.5		1.1		0.8		73.3	0.0	
	Other securities		27.6	42.5	67.6	5.0		1.1		0.8		45.8	0.0	
F ₄	Loans	75.2	122.5	109.7		0.2			8.3		61.3	44.8	37.7	0.0
F ₅	[Domestic] Equity and inv. fund shares	194.0	333.3	84.6	104.1	0.7	6.1	25.1		61.0		78.1		0.0
	[Foreign] Equity and inv. fund shares issued by RoW	72.9		32.8		0.1		-1.2		6.2			110.8	0.0
F ₆	Insurance, pension funds and s.g.s.	1.8			92.5			0.2		89.4		1.1		0.0
F ₇	Fin. derivatives and employee stock options	0.0			1.7	0.0		-0.1		0.0			-1.8	0.0
F ₈	Other accounts receivable/payable	12.8		-3.1		0.0		0.5		4.4		-14.7		0.0
F	Financial wealth		-95.1		7.2		1.9		-78.4		169.4		-4.7	0.0
B90	Net worth		121.9		21.5		1.9		13.5		514.4		-4.7	668.3
	A-(L+B90)		0		0		0		0		0		0	

Source: Authors' calculations using data from INSEE and Webstat (Banque de France)

Note: The totals are the result of operations carried out with more than one decimal (not shown here), therefore totals in the last line and column may differ slightly.

Table 3 Symbolic uses-resources table + flow of funds

Code	Item	Firms		Financial inst excl BdF		Banque de France		Government		Households + NPISH		Rest of the world		Total (uses -res.)
		paid	received	paid	received	paid	received	paid	received	paid	received	paid	received	
P6	Exports											$p_X X$		$p_X X$
P7	Imports												$p_{IM} IM$	$p_{IM} IM$
B11	Trade balance												$-TB$	TB
P1	Production		$p_Q Q^F$		$p_Q Q^B$				$p_Q Q^G$		$p_Q Q^H$			$p_Q Q$
P2	Intermediate consumption	$p_{IC} IC^F$		$p_{IC} IC^B$				$p_{IC} IC^G$		$p_{IC} IC^H$				$p_{IC} IC^H$
B1	Value added		VA^F		VA^B				VA^G		VA^H			VA
D11	Wages and salaries	W_p^F		W_p^B				W_p^G		W_p^H	W_r^H	W_p^R	W_r^R	0
D12	Labor contributions	LC_p^F		LC_p^B				LC_p^G		LC_p^H	LC_r^H	LC_p^R	LC_r^R	0
D29	Taxes on payroll and miscellaneous taxes on production	T_L^F		T_L^B				T_L^G	T_L	T_L^H			T_L^R	0
D319	Subsidies on production								$-Sub$				$-Sub^R$	$-Sub'$
D39	Other subsidies on production		$-Sub_p^F$		$-Sub_p^B$				$-Sub_p^G$		$-Sub_p^H$		$-Sub_p^R$	$-Sub^*$

D39b	Operating subsidies								$-Sub_{C'}^G$					$-Sub_{C'}^G$
B2	Gross operating surplus		Π^F		Π^B		$[\Pi^{CB}]$		$[\Pi^G]$		$[\Pi^H]$			Π
D21	Net taxes on production							T_p					T_p^R	T_p^T
D41	Interest	Int_p^F	Int_p^F	Int_p^B	Int_p^B	Int_p^{CB}	Int_p^{CB}	Int_p^G	Int_p^G	Int_p^H	Int_p^H	Int_p^R	Int_p^R	0
D42	Distributed income of corporations	Div_p^F	Div_p^F	Div_p^B	Div_p^B	Div_p^{CB}	Div_p^{CB}	Div_p^G		Div_p^H		Div_p^R	Div_p^R	0
D43	Reinvested earnings on direct foreign investment	$RFDI_p^F$	$RFDI_p^F$	$RFDI_p^B$	$RFDI_p^B$							$RFDI_p^R$	$RFDI_p^R$	0
D44	Property income attributed to insurance policy holders		INS_r^F		INS_r^B			INS_r^G		INS_r^H		INS_r^R	INS_r^R	0
D45	Rents	$RENT_p^F$						$RENT_r^G$	$RENT_p^H$	$RENT_r^H$				0
D5	Taxes on income and wealth	T^F		T^B		T^{CB}		T	T^H			T^R		0
D61	Social contributions		SC_r^F		SC_r^B			SC_r^G	SC_p^H			SC_p^R	SC_r^R	0
D62	Social benefits	SB_p^F		SB_p^B				SB_p^G		SB_r^H		SB_p^R	SB_r^R	0
D7	Transfers	Tr_p^F		Tr_p^B	Tr_r^B			Tr_p^G		Tr_r^H		Tr_r^R	Tr_r^R	0
B6	Gross disposable income		Y_d^F		Y_d^B			Y_d^G		Y_d^H				Y_d
P3	Consumption							$p_C^H C^H$		$p_C^G C^G$				$p_C C$
B8	Gross saving		S^F		S^B			S^G		S^H				S
D9	Capital transfers		Tr_{Kp}^F		Tr_{Kp}^B			Tr_{Kp}^G		Tr_{Kp}^H		Tr_{Kp}^R	Tr_{Kp}^R	0
P51	Gross Fixed Capital Formation	$p_{I_1}^F I_1^F$		$p_{I_1}^B I_1^B$				$p_{I_1}^G I_1^G$		$p_{I_1}^H I_1^H$				$p_{I_1} I_1$
P52	Changes in inventories	$p_{I_{12}}^F I_{12}^F$						$p_{I_{12}}^G I_{12}^G$		$p_{I_{12}}^H I_{12}^H$				$p_{I_{12}} I_{12}$
P53	Acquisition less disposals of valuables									$p_{I_{13}}^H I_{13}^H$				$p_{I_{13}} I_{13}$
NP	Acquisitions less disposals of non-fin non-produced assets	NP_p^F		NP_p^B				NP_p^G		NP_p^H				0
B9NF	Financing capacity	FCN^F		FCN^B		0		FCN^G		FCN^H		FCN^R		0
Adj	Adjustment B9F - B9NF	Adj^F		Adj^B		Adj^{CB}		Adj^G		Adj^H		Adj^R		0
		Firms		Financial inst excl BdF		Banque de France		Government		Households + NPISH		Rest of the world		
Flow	Instrument	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	
F1	Monetary gold and SDRs					$p_G^{CB} \Delta^* G^{CB}$						$p_G^{CB} \Delta^* G^{CB}$		0
F21	Bills and coins	$\Delta^* H^F$		$\Delta^* H^B$			$\Delta^* H^{CB}$			$\Delta^* H^H$		$\Delta^* H^R$		0
F295	Refinancing between FI				$\Delta^* RF$	$\Delta^* RF^{CB}$						$\Delta^* RF^R$		0
res	Bank reserves			$\Delta^* RES$		$\Delta^* RES$								0
gcb	Govt acc at the CB					$\Delta^* D_A^{CBG}$		$\Delta^* D_A^{CBG}$						0
tgt2	Target2					$\Delta^* TRGT2$						$\Delta^* TRGT2$		0
F2	Deposits	$\Delta^* D_A^F$		$\Delta^* D_A^B$	$\Delta^* D_L^B$	$\Delta^* D_A^{CB}$	$\Delta^* D_L^{CB}$	$\Delta^* D_A^G$	$\Delta^* D_L^G$	$\Delta^* D_A^H$		$\Delta^* D_A^R$	$\Delta^* D_L^R$	0
F3e	Public securities	$p_{BA}^F \Delta^* B_A^F$		$p_{BA}^B \Delta^* B_A^B$	$p_{BA}^B \Delta^* B_A^{CB}$	$p_{BA}^{CBG} \Delta^* B_A^{CBG}$		$p_{BL}^G \Delta^* B_L^G$				$p_{BA}^R \Delta^* B_A^R$	$p_{BL}^R \Delta^* B_L^R$	0
F3d	Foreign securities	$p_{BA}^F \Delta^* B_A^F$		$p_{BA}^B \Delta^* B_A^B$	$p_{BA}^B \Delta^* B_A^{CB}$	$p_{BA}^{CBR} \Delta^* B_A^{CBR}$		$p_{BA}^G \Delta^* B_A^G$		$p_{BA}^H \Delta^* B_A^H$		$p_{BA}^R \Delta^* B_A^R$	$p_{BL}^R \Delta^* B_L^R$	0
F3g	Other securities		$p_{BL}^F \Delta^* B_L^F$	$p_{BA}^B \Delta^* B_A^B$	$p_{BL}^B \Delta^* B_L^B$	$p_{BA}^{CB} \Delta^* B_A^{CB}$		$p_{BA}^G \Delta^* B_A^G$		$p_{BA}^H \Delta^* B_A^H$		$p_{BA}^R \Delta^* B_A^R$		0
F4	Loans	$\Delta^* L_A^F$	$\Delta^* L_L^F$	$\Delta^* L_A^B$		$\Delta^* L^{CB}$			$\Delta^* L_L^G$		$\Delta^* L_L^H$	$\Delta^* L_A^R$	$\Delta^* L_L^R$	0
F5e	Domestic equity and investment fund shares	$p_{EA}^F \Delta^* E_A^F$	$p_{EL}^F \Delta^* E_L^F$	$p_{EA}^B \Delta^* E_A^B$	$p_{EL}^B \Delta^* E_L^B$	$p_{EA}^{CB} \Delta^* E_A^{CB}$	$p_{EL}^{CB} \Delta^* E_L^{CB}$	$p_{EA}^G \Delta^* E_A^G$		$p_{EA}^H \Delta^* E_A^H$		$p_{EA}^R \Delta^* E_A^R$		0
F5d	Foreign equity and investment fund shares	$p_{EA}^F \Delta^* E_A^F$		$p_{EA}^B \Delta^* E_A^B$	$p_{EA}^{CB} \Delta^* E_A^{CB}$	$p_{EA}^{CBR} \Delta^* E_A^{CBR}$		$p_{EA}^G \Delta^* E_A^G$		$p_{EA}^H \Delta^* E_A^H$		$p_{EL}^R \Delta^* E_L^R$		0
F6	Insurance, pension funds and s.g.s.	$\Delta^* A_A^F$			$\Delta^* A_L^B$			$\Delta^* A_A^G$		$\Delta^* A_A^H$		$\Delta^* A_A^R$		0
F7	Fin. derivatives and employee stock options	$\Delta^* X_A^F$			$\Delta^* X_L^B$	$\Delta^* X^{CB}$		$\Delta^* X_A^G$		$\Delta^* X_A^H$			$\Delta^* X_L^R$	0
F8	Other accounts receivable/payable	$\Delta^* Z_A^F$		$\Delta^* Z_A^B$		$\Delta^* Z^{CB}$		$\Delta^* Z_A^G$		$\Delta^* Z_A^H$		$\Delta^* Z_A^R$		0
	Net acquisition of financial assets		$NAFA^F$		$NAFA^B$		$NAFA^{CB}$		$NAFA^G$		$NAFA^H$		$NAFA^R$	0

NPISH = Non-profit institutions serving households

Cells in blue represent the closing items of the corresponding line

Note: The Central Bank's financing capacity is nil; it is paid in full to the government in form of a tax (see equations 233, 234 and 282)

Table 4 Numerical uses-resources table + flow of funds, 2019 % of GDP

		<i>Firms</i>		<i>Financial inst excl BdF</i>		<i>Banque de France</i>		<i>Government</i>		<i>Households + NPISH</i>		<i>Rest of the world</i>		<i>Total (uses -res.)</i>
<i>Code</i>	<i>Item</i>	<i>paid</i>	<i>received</i>	<i>paid</i>	<i>received</i>	<i>paid</i>	<i>received</i>	<i>paid</i>	<i>received</i>	<i>paid</i>	<i>received</i>	<i>paid</i>	<i>received</i>	
P6	Exports											31.8		31.8
P7	Imports												32.8	32.8
B11	Trade balance												1.0	-1.0
P1	Production		124.8		10.1				20.9		20.8			176.6
P2	Intermediate consumption	72.5		6.2				4.9		4.1				-87.7
B1	Value added		52.3		3.9				16.0		16.8			88.9
D11	Wages and salaries	26.1		1.7				8.2		2.3	39.0	0.7	0.1	0
D12	Labor contributions	7.3		0.7				4.0		0.8	13.1	0.2	0.0	0
D29	Taxes on payroll and miscellaneous taxes on production	3.0		0.5				0.5	4.8	1.0			0.1	0
D319	Subsidies on production								-0.9				0.0	-1.0
D39	Other subsidies on production		-1.6		-0.1				-0.1		-0.4		-0.3	-2.4
D39b	Operating subsidies								-1.9					-1.9
B2	Gross operating surplus		17.4		1.1				[3.4]		[13.1]			34.9
D21	Net taxes on production								11.9				0.1	12.0
D41	Interest	2.6	2.1	4.7	6.2	-0.1	0.0	1.5	0.1	0.6	0.6	2.9	3.2	0
D42	Distributed income of corporations	8.3	6.8	1.7	2.2	0.1	0.0		0.3		1.8	3.1	1.9	0
D43	Reinvested earnings on direct foreign investment	0.1	0.1	0.0	0.2							0.3	0.2	0
D44	Property income attributed to insurance policy holders		0.1	2.0					0.1		1.9		-0.1	0
D45	Rents	0.2							0.1	0.1	0.1			0
D5	Taxes on income and wealth	2.0		0.6					13.1	10.3		0.2		0
D61	Social contributions		0.6		1.5				16.8	19.2		0.0	0.3	0
D62	Social benefits	0.6		1.5				19.5			21.4	0.2	0.3	0
D7	Transfers	1.0		4.2	4.2			2.7			2.0		1.7	0
B6	Gross disposable income	12.1	12.1	0.8	0.8			24.3	24.3	62.9	62.9			100.2
P3	Consumption								23.1		53.7			76.8
B8	Gross saving		12.1		0.8				1.2		9.2			23.4
D9	Capital transfers		0.8		0.1			0.4		0.5		0.1	0.1	0.0
P51	Gross Fixed Capital Formation	12.8		1.2				3.7		5.8				23.4
P52	Changes in inventories	0.4						0.0		0.1				0.5
P53	Acquisition less disposals of valuables									0.1				0.1
NP	Acquisitions less disposals of non-fin non-produced assets	0.0		0.0				0.1		-0.1				0.0
B9N F	Net financing capacity	-0.3		-0.3		0.0		-3.0		2.8		0.8		0
Adj	Adjustment B9F - B9NF	-0.1		0.5		-0.4		-0.1		-0.2		0.3		0
		<i>Firms</i>		<i>Financial inst excl BdF</i>		<i>Banque de France</i>		<i>Government</i>		<i>Households + NPISH</i>		<i>Rest of the world</i>		
<i>Flow</i>	<i>Instrument</i>	<i>Asset</i>	<i>Liability</i>	<i>Asset</i>	<i>Liability</i>	<i>Asset</i>	<i>Liability</i>	<i>Asset</i>	<i>Liability</i>	<i>Asset</i>	<i>Liability</i>	<i>Asset</i>	<i>Liability</i>	
F1	Monetary gold and SDRs					0.0							0.0	0
F21	Bills and coins	0.1		0.0			0.6			0.3		0.2		0
F295	Refinancing between FI				-1.9	-0.6							1.3	0
res	Bank reserves			0.7			0.7							0

<i>gcb</i>	Govt acc at the CB					-2.4	-2.4						0	
<i>tgt2</i>	Target2				1.5						1.5	0		
<i>F2</i>	Deposits	2.1		6.1	13.4	0.7	2.2	2.8	0.5	3.3	7.1	6.2	0	
<i>F3e</i>	Public securities	0.1		2.5		-0.5			3.1		0.9		0	
<i>F3d</i>	Foreign securities	0.0		2.9		-0.6		-0.1		0.0		2.3	0	
<i>F3g</i>	Other securities		1.6	0.7	3.3	0.0		0.1		-0.2	4.5		0	
<i>F4</i>	Loans	2.5	5.0	3.8		0.0			0.0		3.7	2.6	0.3	0
<i>F5e</i>	Domestic equity and investment fund shares	0.4	2.8	0.6	0.0	0.1	0.0	0.2		0.4		1.0		0
<i>F5d</i>	Foreign equity and investment fund shares	1.0		1.1		0.0		0.0		-0.3		1.8		0
<i>F6</i>	Insurance, pension funds and s.g.s.	0.0			1.8			0.0		1.7	0.1			0
<i>F7</i>	Fin. derivatives and employee stock options	0.0			-0.2	0.0		0.0		0.0		0.2		0
<i>F8</i>	Other accounts receivable/payable	2.7		-1.7		0.1		-0.3		0.9	-1.8			0
	<i>Net acquisition of financial assets</i>		<i>-0.4</i>		<i>0.3</i>		<i>-0.4</i>		<i>-3.1</i>		<i>2.6</i>		<i>1.1</i>	<i>0</i>

The value of GDP can be obtained from the table above;

- By the **demand approach** as the sum of *public and personal consumption* (76.8), *gross fixed capital formation* by all sectors (23.7), *changes in inventories* except those of households (0.5-0.1), *acquisition less disposals of valuables* (0.1) and *exports* (31.8), less *imports* (32.8).
- By the **income approach** as the sum of *wages and salaries* received by households (39.0) the corresponding *labor contributions* (13.1), the sum of all sectors' *gross operating surplus* (34.9), *taxes on income and wealth* received by the government (13.1) and a slight discrepancy (-0.1).
- By the **production approach** as total *value added* (88.9), *net taxes on production* (12.0) less *subsidies on production* (-1.0).

Table 5 Symbolic revaluations table

[illegible]

Table 6 Numerical revaluations table, 2019 % of GDP

		Firms		Financial inst excl BdF		Banque de France		Government		Households + NPISH		Rest of the world		
Flow	Instrument	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	
NFA1	Produced	1.5		0.1				1.2		1.8				4.7
NFA12	Inventories	0.2		0.0				0.0		0.0				0.1
NFA13	Valuables									-0.1				-0.1
NFA2	Non-produced	3.8		0.3				2.2		7.6				13.8
F1	Monetary gold and SDRs					0.8						0.8		0
F2	Deposits	0.0		0.4	0.5	-0.1	0.1	0.0	0.0	0.0		0.0	-0.2	0
F3e	Public securities	0.0		0.1		0.5			2.6			2.0		0
F3d	Foreign securities	0.0		2.2		0.3		0.0		0.0			2.6	0
F3g	Other securities		1.3	0.3	1.2	0.2		0.0		0.0		2.0		0
F4	Loans	0.1	0.1	-0.1		0.0			0.0		0.0	0.3	0.2	0
F5e	Domestic equity and investment fund shares	30.5	47.7	6.8	9.6	0.0	0.9	2.2		7.6		11.0		0
F5d	Foreign equity and investment fund shares	10.9		4.2		0.0		0.1		0.6			15.7	0
F6	Insurance, pension funds and s.g.s.	0.0			5.0			0.0		5.0		0.0		0
F7	Fin. derivatives and employee stock options	0.0			1.0	0.0		0.0		0.0			-1.0	0
	Net financial revaluations		-7.6		-3.4		0.7		-0.3		13.2		-2.8	0
	Net worth revaluations		-2.0		-3.0		0.7		3.1		22.5		-2.8	18.5
	A-(L+NWR)		0		0		0		0		0		0	

Table 7 Symbolic other changes in volume table

		Firms		Financial inst excl BdF		Banque de France		Government		Households + NPISH		Rest of the world		Total
Flow	Instrument	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	
NFA1	Produced	OCV_{K1}^F		OCV_{K1}^B				OCV_{K1}^G		OCV_{K1}^H				OCV_{K1}
NFA12	Inventories + valuables	OCV_{K12}^F		OCV_{K12}^B				OCV_{K12}^G		OCV_{K12}^H				OCV_{K12}
NFA2	Non-produced	OCV_{K2}^F		OCV_{K2}^B				OCV_{K2}^G		OCV_{K2}^H				OCV_{K2}
F295	Refinancing between FI				OCV_{RF}^B	OCV_{RF}^{CB}							OCV_{RF}^R	0
res	Bank reserves			OCV_{RES}^B		OCV_{RES}^{CB}								0
gcb	Govt acc at the CB					OCV_{DA}^{CBG}	OCV_{DA}^{CB}	OCV_{DA}^{CBG}						0
F2	Deposits	OCV_{DA}^F		OCV_{DA}^B	OCV_{DA}^{BL}	OCV_{DA}^{CB}	OCV_{DA}^{CB}	OCV_{DA}^G	OCV_{DA}^{GL}	OCV_{DA}^H		OCV_{DA}^R	OCV_{DA}^{RL}	0
F3e	Public securities	OCV_{BA}^F		OCV_{BA}^{BG}		OCV_{BA}^{CB}			OCV_{BA}^{GL}			OCV_{BA}^R		0
F3d	Foreign securities	OCV_{BA}^{FR}		OCV_{BA}^{BR}		OCV_{BA}^{CBR}		OCV_{BA}^{GR}		OCV_{BA}^{HR}			OCV_{BA}^{RL}	0
F3g	Other securities		OCV_{BL}^F	OCV_{BA}^B	OCV_{BL}^B	OCV_{BA}^{CB}		OCV_{BA}^G		OCV_{BA}^H		OCV_{BA}^R		0
F4	Loans	OCV_{LA}^F	OCV_{LL}^F	OCV_{LA}^B		OCV_{LA}^{CB}			OCV_{LL}^G		OCV_{LL}^H	OCV_{LA}^R	OCV_{LL}^{RL}	0
F5e	Domestic equity and investment fund shares	OCV_{EA}^{FFR}	OCV_{EL}^{FFR}	OCV_{EA}^{BFR}	OCV_{EL}^{BFR}	OCV_{EA}^{CBFR}	OCV_{EL}^{CBFR}	OCV_{EA}^{GFR}		OCV_{EA}^{HFR}		OCV_{EA}^{RFR}		0
F5d	Foreign equity and investment fund shares	OCV_{EA}^{FR}		OCV_{EA}^{BR}		OCV_{EA}^{CBR}		OCV_{EA}^{GR}		OCV_{EA}^{HR}			OCV_{EA}^{RL}	0
F6	Insurance, pension funds and s.g.s.	OCV_{AA}^F			OCV_{AL}^B			OCV_{AA}^G		OCV_{AA}^H		OCV_{AA}^R		0
F7	Fin. derivatives and employee stock options	OCV_{XA}^F			OCV_{XL}^B	OCV_{XA}^{CB}		OCV_{XA}^G		OCV_{XA}^H			OCV_{XL}^{RL}	0
	Net financial other changes in volume		$FOCV^F$		$FOCV^B$		$FOCV^{CB}$		$FOCV^G$		$FOCV^H$		$FOCV^R$	0
	Net other changes in volume		OCV^F		OCV^B		OCV^{CB}		OCV^G		OCV^H		OCV^R	OCV

Table 8 Numerical other changes in volume table, 2019 % of GDP

Flow	Instrument	Firms		Financial inst excl BdF		Banque de France		Government		Households + NPISH		Rest of the world		Total
		Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability	
NFA1	Produced	0.0		0.0				0.0		0.0				0.0
NFA12	Inventories + valuables	0.0		0.0				0.0		0.0				0.0
NFA2	Non-produced	2.3		0.4				0.5		2.5				5.8
F295	Refinancing between FI				0.0	0.0							0.0	0
res	Bank reserves			0.0			0.0							0
gcb	Govt acc at the CB						2.2	2.2						0
F2	Deposits	0.0		0.0	0.0	0.0	-2.2	-2.2	0.0	0.0		0.0	0.0	0
F3e	Public securities	0.0		0.0		0.0			0.0			0.0		0
F3d	Foreign securities	0.0		-0.9		0.0		0.0		0.0			-0.9	0
F3g	Other securities		0.0	-0.7	-0.6	0.0		0.0		0.0		0.0		0
F4	Loans	-0.2	-0.4	-1.0		0.0			0.0		-0.1	0.3	-0.3	0
F5e	Domestic equity and investment fund shares	0.4	0.3	-0.2	-0.0	0.0	0.0	0.2		-0.2		0.1		0
F5d	Foreign equity and investment fund shares	0.2		-0.0		-0.0		-0.0		-0.0			0.1	0
F6	Insurance, pension funds and s.g.s.	0.1			0.2			0.0		0.1		0.0		0
F7	Fin. derivatives and employee stock options	0.0			0.0	0.0		0.0		0.0			0.0	0
	Net financial other changes in volume		0.5		-1.8		0.0		0.2		0.0		1.0	0
	Net other changes in volume		2.8		-1.3		0.0		0.7		2.5		1.0	5.8

Note: some rows that exhibit 0 in 2019 are not shown in the tables.

Equation 1 GDP in volume

$$Y = \underbrace{C^H + C^G}_{\text{Consumption}} + \underbrace{I_1^F + I_1^B + I_1^G + I_1^H}_{\text{Gross Fixed Capital Formation}} + \underbrace{I_{12}^F + I_{12}^G + I_{12}^H + I_{13}^H}_{\Delta \text{inventories} + \text{net val.}} + \underbrace{\bar{X} - \bar{IM}}_{\text{Trade balance}}$$

Equation 2 Value added, value

$$VA = p_Y Y - T_p - T_p^R + Sub + Sub^R$$

[Reminder: Sub and Sub^R appear with a negative sign in Table 4, therefore in the code they appear with a negative sign, and in the previous formula with a positive one.]

Equation 3 Consumer price index

$$p_C^H = \left(\frac{p_Y Y - p_C^G C^G - p_{I_1}^F I_1^F - p_{I_1}^B I_1^B - p_{I_1}^G I_1^G - p_{I_1}^H I_1^H - p_{I_{12}}^F I_{12}^F - p_{I_{12}}^G I_{12}^G - p_{I_{13}}^H I_{13}^H - p_X X + p_{IM} IM}{Y - C^G - I_1^F - I_1^B - I_1^G - I_1^H - I_{12}^F - I_{12}^G - I_{13}^H - X + IM} \right)$$

[Reminder: Sub and Sub^R appear with a negative sign in Table 4, therefore in the code they appear with a negative sign, and in the previous formula with a positive one.]

Equation 4 Value added, firms

$$VA^G = \alpha_{VA}^G (W_p^G + LC_p^G)$$

$$VA^F = VA - VA^B - VA^G - VA^H$$

Equation 8 Value added, volume

Equation 5 Value added, households

$$va = \left(\frac{VA}{p_Y} \right)$$

$$VA^H = \alpha_{VA}^H (VA - VA^B - VA^G)$$

Equation 9 Value added, market sector (value)

Equation 6 Value added, banks

$$VA^M = VA^F + VA^B + VA^H$$

$$VA^B = \alpha_{va}^B p_Y$$

Equation 10 Value added market sector, volume

Equation 7 Value added, public sector

$$va^M = \left(\frac{VA^M}{p_Y} \right)$$

Non-financial corporations

Equation 11 Wages paid

$$W_p^F = w_p^F N^F$$

Equation 12 Labor contributions paid

$$LC_p^F = \beta_{LC}^F W_p^F$$

Equation 13 Labor taxes

$$T_L^F = \beta_{TL}^F W_p^F$$

Equation 14 Subsidies received

$$Sub_r^F \text{ exogenous}$$

Equation 15 Profits

$$\Pi^F = VA^F - W_p^F - LC_p^F - T_L^F - Sub_r^F$$

Equation 16 Interests received

$$Int_r^F = r_A^F (D_{A-1}^F + p_{B_{A-1}}^{FG} B_{A-1}^{FG} + p_{B_{A-1}}^{FR} B_{A-1}^{FR} + L_{A-1}^F)$$

Equation 17 Interests paid

$$Int_p^F = r_L^F (p_{B_{L-1}}^F B_{L-1}^F + L_{L-1}^F)$$

Equation 18 Dividends paid

$$Div_p^F = \gamma_{div_p}^F \Pi^F$$

Equation 19 Dividends received

$$Div_r^F = \gamma_{div_r}^F p_{E_{A-1}}^F E_{A-1}^F$$

Equation 20 Redistributed earnings on FDI received

$$RFDI_r^F = RFDI_p^F + RFDI_p^B + RFDI_p^R - RFDI_r^B - RFDI_r^R$$

Equation 21 Redistributed earnings on FDI paid

$$RFDI_p^F = r_{FDI}^F p_{E_{L-1}}^F E_{L-1}^F$$

Equation 22 Property income attributed to insurance policy holders received

$$INS_r^F = r_{A_A}^F A_{A-1}^F$$

Equation 23 Rents paid

$$RENT_p^F = rent_p^F VA^F$$

Equation 24 Corporate taxes

$$T^F = \theta_T^F (\Pi_{-1}^F + Int_{r-1}^F - Int_{p-1}^F + Div_{r-1}^F - Div_{p-1}^F + RFDI_{r-1}^F - RFDI_{p-1}^F + INS_{r-1}^F - RENT_{p-1}^F)$$

Equation 25 Social benefits paid

$$SB_p^F = \gamma_{SB_p}^F p_Y Y$$

Equation 26 Social contributions received

$$SC_r^F = \theta_{SC}^F (SC_p^H + SC_p^R)$$

Equation 27 Miscellaneous transfers paid

$$Tr_p^F = \theta_{Tr_p}^F p_Y Y$$

Equation 28 Disposable (corporate) income

$$Y_d^F = \Pi^F + Int_r^F - Int_p^F + Div_r^F - Div_p^F + RFDI_r^F - RFDI_p^F + INS_r^F - RENT_p^F - T^F + SC_r^F - SB_p^F - Tr_p^F$$

Equation 29 Savings (self-financing)

$$S^F = Y_d^F$$

Equation 30 Net acquisition of non-financial non-produced assets

$$NP^F = \theta_{NP_p}^F p_Y Y$$

Equation 31 Capital transfers

$$Tr_{K_r}^F = \theta_{Tr_{K_r}}^F p_Y Y$$

Equation 32 Financing capacity/need

$$FCN^F = S^F - p_{I_1}^F I_1^F - p_{I_{12}}^F I_{12}^F - NP^F + Tr_{K_r}^F$$

Equation 33 Gross investment

$$I_1^F = \Delta^* K_1^F + \delta_{K_1}^F K_{1-1}^F$$

Equation 34 Net produced non-financial assets, flow (accumulation rate) $\rightarrow$ model runs with option 1

Option 1, without output gap

$$\left(\frac{\Delta^* K_1^F}{K_{1-1}^F} \right) = 0.02 + 0.1 \left(\frac{\Pi_{-1}^F}{p_{K_{1-1}}^F K_{1-2}^F + p_{K_{2-1}}^F K_{2-2}^F} \right) - 0.1(r_L^F - \pi_Y) - 0.02(r_{E_A}^F - \pi_Y) - 0.03 \left(\frac{L_L^F}{p_{E_L}^F E_L^F + WLTH^F} \right)$$

Option 2, with output gap

$$\left(\frac{\Delta^* K_1^F}{K_{1-1}^F} \right) = 0.03 - 0.06(r_L^F - \pi_Y) - 0.02 \left(\frac{L_L^F}{p_{E_L}^F E_L^F + WLTH^F} \right) + 0.3GAP$$

Equation 35 Gross investment, price

$$\Delta \ln(p_I^F) = 0.96 \Delta \ln(p_Y)$$

Equation 36 Produced non-financial assets, price

$$p_{K_1}^F = \theta_{p_{K_1}}^F p_I^F$$

Equation 37 Non-financial assets, stock

$$p_{K_1}^F K_1^F = (1 - \delta_{K_1}^F) p_{K_{1-1}}^F K_{1-1}^F + p_{I_1}^F I_1^F + K_{1-1}^F \Delta p_{K_1}^F + OCV_{K_1}^F$$

Equation 38 Inventories, price

$$\Delta \ln(p_{I_{12}}^F) = 0.3 \Delta \ln(p_{I_{12-1}}^F) + 0.6 \Delta \ln(p_{Y-1})$$

Equation 39 Inventories, stock

$$\Delta \ln(K_{12}^F) = -0.01 + 0.8 \Delta \ln(K_{12-1}^F) + 1.2 \Delta \ln(va^F) - 0.6 \Delta \ln(va_{-1}^F)$$

Equation 40 Value added by firms, volume

$$va^F = \left(\frac{VA^F}{p_Y} \right)$$

Equation 41 Inventories, flow

$$p_{I_{12}}^F I_{12}^F = \Delta(p_{K_{12}}^F K_{12}^F) - K_{12-1}^F \Delta p_{K_{12}}^F - OCV_{K_{12}}^F$$

Equation 42 Non-produced non-financial assets, price

$$\ln(p_{K_2}^F) = 0.86 \ln(p_{K_{2-1}}^F) + 0.8 \ln(p_{K_2}^H) - 0.7 \ln(p_{K_{2-1}}^H)$$

Equation 43 Non-produced non-financial assets, stock (mainly constructible land)

$$p_{K_2}^F K_2^F = p_{K_{2-1}}^F K_{2-1}^F + p_{K_2}^F I_2^F + K_{2-1}^F \Delta p_{K_2}^F + OCV_{K_2}^F$$

Equation 44 Non-produced non-financial assets, flow

$$I_2^F \text{ exogenous (close to nil)}$$

Equation 45 Public securities held, stock

$$p_{B_A}^{F_G} B_A^{F_G} = \psi_{F1} V A^F$$

Equation 46 Public securities held, stock

$$\Delta^* B_A^{F_G} = \Delta B_A^{F_G} - \left(\frac{OCV_{B_A}^{F_G}}{p_{B_A}^{F_G}} \right)$$

Equation 47 Public securities held, price

$$p_{B_A}^{F_G} = \psi_{p_{B_A}}^{F_G} p_{B_L}^{F_G}$$

Equation 48 Foreign securities held, stock

$$p_{B_A}^{F_R} B_A^{F_R} = \psi_{F2} V A^F$$

Equation 49 Foreign securities held, flow

$$\Delta^* B_A^{F_R} = \Delta B_A^{F_R} - \left(\frac{OCV_{B_A}^{F_R}}{p_{B_A}^{F_R}} \right)$$

Equation 50 Foreign securities held, price

$$p_{B_A}^{F_R} = \psi_{p_{B_A}}^{F_R} p_{B_L}^{F_R}$$

Equation 51 Equities held, flow (accumulation rate)

$$\left(\frac{\Delta^* E_A^F}{E_{A-1}^F} \right) = 0.35 \left(\frac{\Pi^F}{p_{K_1}^F K_{1-1}^F + p_{K_{12}}^F K_{12-1}^F + p_{K_2}^F K_{2-1}^F} + 0.02 (r_{E_{L-1}}^F - \pi_{Y-1}) + 0.01 \left(\frac{p_{L_L}^F L_L^F}{p_{E_L}^F E_L^F + WLTH^F} \right) \right)$$

Equation 52 Equities held, price (i.e. CAC 40)

$$p_{E_A}^F = p_{E_A}^{F_{FR}} \left(\frac{p_{E_A}^{F_{FR}} E_A^{F_{FR}}}{p_{E_A}^F E_A^F} \right) + p_{E_A}^{F_R} \left(\frac{p_{E_A}^{F_R} E_A^{F_R}}{p_{E_A}^F E_A^F} \right)$$

Equation 53 Equities held, stock

$$E_A^F = E_{A-1}^F + \Delta^* E_A^F + \left(\frac{OCV}{p_{E_A}^F} \right)$$

Equation 54 Domestic equities held, stock

$$p_{E_A}^{F_{FR}} E_A^{F_{FR}} = \psi_{p_{E_A}}^{F_{FR}} p_{E_A}^F E_A^F$$

Equation 55 Domestic equities held, price

$$p_{E_A}^{F_{FR}} = \eta_{p_{E_A}}^{F_{FR}} p_E^{F_{FR}}$$

Equation 56 Domestic equities held, flow

$$\Delta^* E_A^{F_{FR}} = \Delta E_A^{F_{FR}} - \left(\frac{OCV_{E_A}^{F_{FR}}}{p_{E_A}^{F_{FR}}} \right)$$

Equation 57 Foreign equities held, stock

$$p_{E_A}^{F_R} E_A^{F_R} = p_{E_A}^F E_A^F - p_{E_A}^{F_{FR}} E_A^{F_{FR}}$$

Equation 58 Foreign equities held, flow

$$\Delta^* E_A^{F_R} = \Delta E_A^{F_R} - \left(\frac{OCV_{E_A}^{F_R}}{p_{E_A}^{F_R}} \right)$$

Equation 59 Foreign equities held, price

$$\Delta \ln(p_{E_A}^{F_R}) = -0.6 \Delta \ln(p_{E_{A-1}}^{F_R}) + 1.1 \Delta \ln(p_E^*)$$

Equation 60 Profitability of equities held

$$r_{E_A}^F = \left(\frac{E_{A-1}^F \Delta p_{E_A}^F + Div_r^F}{p_{E_{A-1}}^F E_{A-1}^F} \right)$$

Equation 61 Deposits, stock

$$\Delta \left(\frac{D_A^F}{p_Y Y} \right) = 0.009 + 0.4 \Delta \left(\frac{D_{A-1}^F}{p_{Y-1} Y_{-1}} \right) - 0.14 (i_{10yrs} - \pi_Y)$$

Equation 62 Deposits, flow

$$\Delta^* D_A^F = \Delta D_A^F - \text{reval}_{D_A}^F - OCV_{D_A}^F$$

Equation 63 Credit assets, flow

$$\left(\frac{\Delta^* L_A^F}{V A^F} \right) = 0.5 \left(\frac{\Delta^* L_{A-1}^F}{V A_{-1}^F} \right) + 0.5 \left(\frac{\Delta^* L_L^F}{V A^F} \right) - 0.3 \left(\frac{\Delta^* L_{L-1}^F}{V A_{-1}^F} \right)$$

Equation 64 Credit assets, stock

$$L_A^F = L_{A-1}^F + \Delta^* L_A^F + \text{reval}_{L_A}^F + OCV_{L_A}^F$$

Equation 65 Bills and coins, stock

$$H^F = \psi_{H}^F p_Y Y$$

Equation 66 Bills and coins, flow

$$\Delta^* H^F = \Delta H^F - OCV_H^F$$

Equation 67 Insurance, pension funds and standardized guarantee schemes, flow

$$\Delta^* A_A^F = \psi_{A_A}^F V A^F$$

Equation 68 Insurance, pension funds and standardized guarantee schemes, stock

$$A_A^F = A_{A-1}^F + \Delta^* A_A^F + OCV_{A_A}^F$$

Equation 69 Total indebtedness, stock

$$\begin{aligned} & \Delta \left(\frac{p_{B_{L_L}}^F B_{L_L}^F}{p_{K_1}^F K_1^F + p_{K_{12}}^F K_{12}^F + p_{K_2}^F K_2^F} \right) \\ &= 0.3 \Delta \left(\frac{p_{B_{L_{L-1}}}^F B_{L_{L-1}}^F}{p_{K_{1-1}}^F K_{1-1}^F + p_{K_{12-1}}^F K_{12-1}^F + p_{K_{2-1}}^F K_{2-1}^F} \right) \\ &+ 1.8 \Delta \left(\frac{\Pi^F}{p_{K_{1-1}}^F K_{1-2}^F + p_{K_{12-1}}^F K_{12-2}^F + p_{K_{2-1}}^F K_{2-2}^F} \right) - 0.07 vc_{-1} \end{aligned}$$

$$vc = \left(\frac{p_{BL}^F B_L^F}{p_{K_1}^F K_1^F + p_{K_{12}}^F K_{12}^F + p_{K_2}^F K_2^F} \right) - 7.7 \left(\frac{\Pi^F}{p_{K_1}^F K_{1-1}^F + p_{K_{12}}^F K_{12-1}^F + p_{K_2}^F K_{2-1}^F} \right) + 3.2(i_{10years} - \pi_Y)$$

Equation 70 Total indebtedness, flow

$$\Delta^* B_L^F = \Delta B_L^F - \left(\frac{OCV_{BL}^F}{p_{BL}^F} \right)$$

Equation 71 Bonds issued, stock

$$\left(\frac{p_{BL}^F B_L^F}{p_{BL}^F B_L^F} \right) = 0.9 \left(\frac{p_{BL-1}^F B_L^F}{p_{BL-1}^F B_L^F} \right) + 0.002 \ln(p_{BL}^F)$$

Equation 72 Total indebtedness, price

$$\Delta \ln(p_{BL}^F) = 0.4 \Delta \ln(p_{BL-1}^F) + 0.13 \Delta \ln(p_{BL}^F) - 0.09 \Delta \ln(p_{BL-1}^F) - 0.05 vc_{-1}$$

$$vc = \ln(p_{BL}^F) - 0.02 - 0.2 \ln(p_{BL}^F)$$

Equation 73 Bonds issued, price

$$\ln(p_{BL}^F) = 0.8 \ln(p_{BL-1}^F) + 0.9 \ln(p_{BL}^G) - 0.7 \ln(p_{BL-1}^G)$$

Equation 74 Bonds issued, flow

$$\Delta^* B_L^F = \Delta B_L^F - \left(\frac{OCV_{BL}^F}{p_{BL}^F} \right)$$

Equation 75 Loans issued, flow

$$\Delta^* L_L^F = p_{BL}^F \Delta^* B_L^F - p_{BL}^F \Delta^* B_L^F$$

Equation 76 Loans issued, stock

$$L_L^F = L_{L-1}^F + \Delta^* L_L^F + reval_{L_L}^F + OCV_{L_L}^F$$

Equation 77 Other accounts payable/receivable, stock (net assets)

$$Z^F = \theta_Z^F p_Y Y$$

Equation 78 Other accounts payable/receivable, flow (net assets)

$$\Delta^* Z^F = \Delta Z^F - OCV_Z^F$$

Equation 79 Equities issued, flow; **closes account** of non-financial corporations

$$p_E^F \Delta^* E_L^F = p_{I_1}^F I_1^F + p_{I_{12}}^F I_{12}^F + \Delta^* H^F + \Delta^* D_A^F + p_{B_A}^{F_G} \Delta^* B_A^{F_G} + p_{B_A}^{F_R} \Delta^* B_A^{F_R} + \Delta^* L_A^F + p_{E_A}^F \Delta^* E_A^F + \Delta^* A_A^F + \Delta^* X^F + \Delta^* Z^F - p_{B_L}^F \Delta^* B_L^F - \Delta^* L_L^F - S^F + NP^F - Tr_{K_r}^F - Adj^F$$

Equation 80 Equities issued, price

$$p_{E_L}^F = \theta_{p_{E_L}}^F p_E^{FR}$$

Equation 81 Equities issued, stock

$$E_L^F = E_{L-1}^F + \Delta^* E_L^F + \left(\frac{OCV_{E_L}^F}{p_{E_L}^F} \right)$$

Equation 82 Profitability of equities issued

$$r_{E_L}^F = \left(\frac{E_{L-1}^F \Delta p_{E_L}^F + Div_p^F}{p_{E_L-1}^F E_{L-1}^F} \right)$$

Equation 83 Price of domestic equity (the simulations shown are with v1)

$$\Delta \ln(p_E^{FR}) = 0.9 \Delta \ln(p_E^*) - 0.4 \Delta \ln(p_{E-1}^*) - 0.5 vc_{-1} \quad v1$$

$$vc = \ln(p_E^{FR}) + 9.6 - 0.8 \ln(p_E^*) - 2.3 \ln \left(\frac{p_E^{FR} E_A^{FR}}{p_{E_A}^F E_A^F} \times 100 \right)$$

$$\begin{aligned} p_E^{FR} E_A^{FR} &= p_{E_A}^{FR} E_A^{FR} + p_{E_A}^{B_{FR}} E_A^{B_{FR}} + p_{E_A}^{CB_{FR}} E_A^{CB_{FR}} + p_{E_A}^{G_{FR}} E_A^{G_{FR}} \\ &\quad + p_{E_A}^{H_{FR}} E_A^{H_{FR}} \\ p_E E_A &= p_{E_A}^F E_A^F + p_{E_A}^B E_A^B + p_{E_A}^{CB} E_A^{CB} + p_{E_A}^G E_A^G + p_{E_A}^H E_A^H \end{aligned}$$

$$p_E^{FR} = \left(\frac{p_{E_A}^{FR} E_A^{FR} + p_{E_A}^{B_{FR}} E_A^{B_{FR}} + p_{E_A}^{CB_{FR}} E_A^{CB_{FR}} + p_{E_A}^{G_{FR}} E_A^{G_{FR}} + p_{E_A}^{H_{FR}} E_A^{H_{FR}}}{E_L^F + E_L^B + E_L^{CB} - E_A^{**R}} \right) v2$$

Equation 84 Domestic equities held by the rest of the world (at constant prices)

$$E_A^{**R} = \left(\frac{p_{E_A}^R E_A^R}{p_E^{FR}} \right)$$

Equation 85 Profitability of domestic equities

$$r_E^{FR} = \left(\frac{Div_p^F + Div_p^B + E_{L-1}^F \Delta p_{E_L}^F + E_{L-1}^B \Delta p_{E_L}^B}{p_{E_{L-1}}^F E_{L-1}^F + p_{E_{L-1}}^B E_{L-1}^B} \right)$$

Equation 86 Financial wealth

$$FW^F = H^F + D_A^F + p_{B_A}^{F_G} B_A^{F_G} + p_{B_A}^{F_R} B_A^{F_R} + L_A^F + p_{E_A}^F E_A^F + A_A^F + X^F + Z^F - p_{B_L}^F B_L^F - L_L^F - p_{E_L}^F E_L^F$$

Equation 87 Net wealth

$$WLTH^F = p_{K_1}^F K_1^F + p_{K_{12}}^F K_{12}^F + p_{K_2}^F K_2^F + FW^F$$

Households and NPISH

Equation 88 Wages paid by households

$$W_p^H = W^M - W_p^F - W_p^B$$

Equation 89 Total wages received

$$W_r^H = W + W_p^R - W_r^R$$

Equation 90 Labor contributions paid by individual entrepreneurs

$$LC_p^H = \beta_{LC}^H W_p^H$$

Equation 91 Labor contributions received

$$LC_r^H = \sum_i LC_p^i - LC_r^R \quad \text{for } i = F, B, G, H, R$$

Equation 92 Labor taxes paid

$$T_L^H = \beta_{TL}^H W_p^H$$

Equation 93 Subsidies received

$$Sub_r^H = \beta_{Sub_r}^H p_Y Y$$

[Operating surplus of individual entrepreneurs $\rightarrow \Pi^H = VA^H - W_p^H - LC_p^H - T_L^H + Sub_r^H$]

Equation 94 Interests received

$$Int_r^H = r_A^H (D_{A-1}^H + p_{B_{A-1}}^H B_{A-1}^H + p_{B_{A-1}}^H B_{A-1}^H)$$

Equation 95 Interests paid

$$Int_p^H = r_L^H L_{L-1}^H$$

Equation 96 Dividends received

$$Div_r^H = \gamma_{div_r}^H p_{E_{A-1}}^H E_{A-1}^H$$

Equation 97 Property income attributed to insurance policy holders received

$$INS_r^H = r_{AA}^H A_{A-1}^H$$

Equation 98 Rents paid

$$RENT_p^H = RENT_r^G + RENT_r^H - RENT_p^F$$

Equation 99 Rents received

$$RENT_r^H = rent_r^H p_{K_{2-1}}^H K_{2-1}^H$$

Equation 100 Income tax paid

$$T^H = \theta_T^H (VA_{-1}^H + W_{r-1}^H - W_{p-1}^H + LC_{r-1}^H - LC_{p-1}^H - T_{L-1}^H + Int_{r-1}^H - Int_{p-1}^H + Div_{r-1}^H + INS_{r-1}^H + RENT_{r-1}^H - RENT_{p-1}^H)$$

Equation 101 Social contributions paid by workers

$$LCW_p^H = \theta_{SC}^H W_r^H$$

Equation 102 Social contributions paid

$$SC_p^H = LC_r^H + LCW_p^H$$

Equation 103 Social benefits received

$$SB_r^H = -SB_r^R + \sum_i SB_p^i \text{ for } i = F, B, G, H, R$$

Equation 104 Social benefits paid

$$SB_p^H = \theta_{SB_p}^H p_Y Y$$

Equation 105 Miscellaneous transfers received (net)

$$Tr_r^H = Tr_p^F + Tr_p^G + Tr_p^B - Tr_r^B - Tr_r^R$$

Equation 106 Disposable income

$$Y_d^H = VA^H - W_p^H - LC_p^H - T_L^H + Sub_r^H + Int_r^H - Int_p^H + Div_r^H + INS_r^H + RENT_r^H - RENT_p^H + W_r^H + LC_r^H - T^H - SC_p^H + SB_r^H + Tr_r^H$$

Equation 107 Personal consumption (volume)

$$\Delta \ln(C^H) = 0.6 \Delta \ln \left(\frac{Y_d^H}{p_C^H} \right) + 0.09 \Delta \ln \left(\frac{WLTH^H}{p_C^H} \right) - 0.14 vc_{-1}$$

$$vc = \ln(C^H) - 0.5 - 0.86 \ln \left(\frac{Y_d^H}{p_C^H} \right) - 0.04 \ln \left(\frac{WLTH^H}{p_C^H} \right)$$

Equation 108 Savings

$$S^H = Y_d^H - p_C^H C^H$$

Equation 109 Net acquisition of non-financial non-produced assets

$$NP^H = \theta_{NP_p}^H p_Y Y$$

Equation 110 Capital transfers paid

$$Tr_{K_p}^H = \theta_{Tr_{K_p}}^H p_Y Y$$

Equation 111 Financing capacity/need

$$FCN^H = S^H - p_{I_1}^H I_1^H - p_{I_{12}}^H I_{12}^H - p_{I_{13}}^H I_{13}^H - NP^H - Tr_{K_p}^H$$

Equation 112 Investment

$$\Delta \ln(I_1^H) = 0.4 \Delta \ln(I_{1-1}^H) + 0.4 \Delta \ln \left(\frac{Y_d^H}{p_I^H} \right) - 0.6 \Delta (i_{10years} - \pi_I^H) - 0.4 vc_{-1}$$

$$vc = \ln(I_1^H) - 1.1 - 0.5 \ln \left(\frac{Y_d^H}{p_I^H} \right) + 0.9 (i_{10years} - \pi_I^H) - 0.2 \left(\frac{\Delta p_{K_2}^H}{p_{K_2-1}^H} \right)$$

Equation 113 Investment, price

$$\Delta \ln(p_I^H) = 0.98 \Delta \ln(p_Y)$$

Equation 114 Produced non-financial assets, price

$$\Delta \ln(p_{K_1}^H) = 0.003 + 0.8 \Delta \ln(p_{K_{1-1}}^H) + 0.76 \Delta \ln(p_Y) - 0.72 \Delta \ln(p_{Y-1})$$

Equation 115 Produced non-financial assets, stock (including housing investment)

$$p_{K_1}^H K_1^H = (1 - \delta_{K_1}^H) p_{K_{1-1}}^H K_{1-1}^H + p_{I_1}^H I_1^H + K_{1-1}^H \Delta p_{K_1}^H + OCV_{K_1}^H$$

Equation 116 Non-produced non-financial assets, price

$$\Delta \ln(p_{K_2}^H) = 0.61 \Delta \ln(p_{K_{2-1}}^H) + 0.9 \Delta \ln(I_1^H) - 0.15 vc_{-1}$$

$$vc = \ln(p_{K_2}^H) + 9.5 - 2.1 \ln(I_{1-1}^H) - 1.5 \ln \left(\frac{L_L^H}{Y_d^H} \right)$$

Equation 117 Non-produced non-financial assets, stock (mainly constructible land)

$$p_{K_2}^H K_2^H = p_{K_2}^H K_{2-1}^H + p_{K_2}^H I_{2*}^H + K_{2-1}^H \Delta p_{K_2}^H + OCV_{K_2}^H$$

Equation 118 Bills and coins, stock

$$H^H = \psi_H^H Y_d^H$$

Equation 119 Bills and coins, flow

$$\Delta^* H^H = \Delta H^H - OCV_H^H$$

Equation 120 Deposits, stock (mainly savings accounts)

$$\Delta \left(\frac{D_A^H}{Y_d^H} \right) = 0.5 \Delta \left(\frac{D_{A-1}^H}{Y_{d-1}^H} \right) - 0.4 \Delta (i_{10yrs-1} - \pi_{C-1}^H) - 0.2 vc_{-1}$$

$$vc = \left(\frac{D_A^H}{Y_d^H} \right) - 0.9 + 1.04 (i_{10yrs-1} - \pi_{C-1}^H)$$

Equation 121 Deposits, flow

$$\Delta^* D_A^H = \Delta D_A^H - reval_{D_A}^H - OCV_{D_A}^H$$

Equation 122 Foreign securities held by households, stock

$$p_{BA}^{HR} B_A^{HR} = \psi_{BA}^{HR} Y_d^H$$

Equation 123 Foreign securities held by households, price

$$p_{BA}^{HR} = \psi_{p_{BA}}^{HR} p_{BL}^R$$

Equation 124 Foreign securities held by households, flow

$$\Delta^* B_A^{HR} = \Delta B_A^{HR} - \left(\frac{OCV_{BA}^{HR}}{p_{BA}^{HR}} \right)$$

Equation 125 Other securities held by households, stock

$$p_{BA}^H B_A^H = \psi_{BA}^H Y_d^H$$

Equation 126 Other securities held by households, price

$$p_{BA}^H = \psi_{p_{BA}}^H p_{BL}^B$$

Equation 127 Other securities held by households, flow

$$\Delta^* B_A^H = \Delta B_A^H - \left(\frac{OCV_{BA}^H}{p_{BA}^H} \right)$$

Equation 128 Equities held, stock

$$\Delta \left(\frac{p_{EA}^H E_A^H}{Y_d^H} \right) = 1.8 \Delta (r_{EA}^H - \pi_C^H) - 0.24 vc_{-1}$$

$$vc = \left(\frac{p_{EA}^H E_A^H}{Y_d^H} \right) - 0.9 - 2.2 (r_{EA}^H - \pi_C^H) + 3.1 (i_{10years} - \pi_C^H)$$

Equation 129 Equities held, price

$$p_{EA}^H = p_{EA}^{HFR} \left(\frac{p_{EA}^{HFR} E_A^{HFR}}{p_{EA}^H E_A^H} \right) + p_{EA}^{HR} \left(\frac{p_{EA}^{HR} E_A^{HR}}{p_{EA}^H E_A^H} \right)$$

Equation 130 Equities held, flow

$$\Delta^* E_A^H = \Delta E_A^H - \left(\frac{OCV_{EA}^H}{p_{EA}^H} \right)$$

Equation 131 Profitability of equities held by households

$$r_{EA}^H = \left(\frac{E_{A-1}^H \Delta p_{EA}^H + Div_r^H}{p_{EA-1}^H E_{A-1}^H} \right)$$

Equation 132 Domestic equities held by households, stock

$$p_{EA}^{HFR} E_A^{HFR} = \psi_E^H p_{EA}^H E_A^H$$

Equation 133 Domestic equities held by households, price

$$p_{EA}^{HFR} = \eta_{p_{EA}}^{HFR} p_E^{FR}$$

Equation 134 Domestic equities held by households, flow

$$\Delta^* E_A^{HFR} = \Delta E_A^{HFR} - \left(\frac{OCV_{EA}^{HFR}}{p_{EA}^{HFR}} \right)$$

Equation 135 Foreign equities held by households, stock

$$p_{EA}^{HR} E_A^{HR} = p_{EA}^H E_A^H - p_{EA}^{HFR} E_A^{HFR}$$

Equation 136 Foreign equities held by households, price

$$p_{EA}^{HR} \text{ exogenous}$$

Equation 137 Foreign equities held by households, stock

$$\Delta^* E_A^{HR} = \Delta E_A^{HR} - \left(\frac{OCV_{EA}^{HR}}{p_{EA}^{HR}} \right)$$

Equation 138 Insurance, pension funds and standardized guarantee schemes, stock

$$\begin{aligned} \Delta \left(\frac{A_A^H}{Y_d^H} \right) &= 0.27 \Delta \left(\frac{A_{A-1}^H}{Y_{d-1}^H} \right) + 0.02 \Delta (DepRatio_{old}) \\ &\quad + 0.3 (i_{10years} - \pi_C^H) + 0.1 (r_{EA}^H - \pi_C^H) \\ &\quad - 0.15 vc_{-1} \\ vc &= \left(\frac{A_A^H}{Y_d^H} \right) + 2.7 - 0.13 (DepRatio_{old}) \end{aligned}$$

$DepRatio_{old}$ = dependency ratio, old

Equation 139 Insurance, pension funds and standardized guarantee schemes, flow

$$\Delta^* A_A^H = \Delta A_A^H - reval_{AA}^H - OCV_{AA}^H$$

Equation 140 Loans, flow; closes account of households

$$\begin{aligned} \Delta^* L_L^H &= p_{L1}^H I_1^H + p_{L12}^H I_{12}^H + \Delta^* H^H + \Delta^* D_A^H + p_{BA}^{HR} \Delta B_A^{HR} + p_{BA}^H \Delta^* B_A^H \\ &\quad + p_{EA}^H \Delta^* E_A^H + \Delta^* A_A^H + \Delta^* Z^H - S^H + NP^H \\ &\quad + Tr_{Kp}^H - Adj^H \end{aligned}$$

Equation 141 Change in inventories

$$p_{L12}^H I_{12}^H \text{ exogenous}$$

[Note: this is the sum of Changes in Inventories and Acquisition less disposals of valuables p52+p53, see Table 3]

Equation 142 Loans, stock

$$L_L^H = L_{L-1}^H + \Delta^* L_L^H + reval_{L_L}^H + OCV_{L_L}^H$$

Equation 143 Other accounts payable/receivable, stock (net assets)

$$Z^H = \psi_Z^H p_Y Y$$

Equation 144 Other accounts payable/receivable, flow (net assets)

$$\Delta^* Z^H = \Delta Z^H - OCV_Z^H$$

Equation 145 Financial wealth

$$FW^H = H^H + D_A^H + p_{BA}^{HR} B_A^{HR} + p_{BA}^H B_A^H + p_{EA}^H E_A^H + A_A^H - L_L^H + Z^H$$

Equation 146 Net wealth

$$WLTH^H = p_{K1}^H K_1^H + p_{K12}^H K_{12}^H + p_{K13}^H K_{13}^H + p_{K2}^H K_2^H + FW^H$$

Financial institutions

Equation 147 Wages paid by banks

$$W_p^B = w_p^B N^B$$

Equation 148 Labor contributions paid

$$LC_p^B = \beta_{EC}^B W_p^B$$

Equation 149 Labor taxes paid

$$T_L^B = \beta_{TL}^B W_p^B$$

Equation 150 Subsidies received

$$Sub_r^B = \beta_{Sub_r}^B p_Y Y$$

Equation 151 Profits

$$\Pi^B = VA^B - W_p^B - LC_p^B - T_L^B + Sub_r^B$$

Equation 152 Interests paid

$$Int_p^B = r_L^B (D_{L-1}^B + p_{B_{L-1}}^B B_{L-1}^B) + r_{CB} RF_{-1}$$

Equation 153 Interests received

$$Int_r^B = Int_p^F + Int_p^B + Int_p^{CB} + Int_p^G + Int_p^H + Int_p^R - Int_r^{CB} - Int_r^F \\ - Int_r^G - Int_r^H - Int_r^R$$

Equation 154 Dividends paid

$$Div_p^B = \gamma_{div_p}^B \Pi^B$$

Equation 155 Dividends received

$$Div_r^B = \gamma_{div_r}^B p_{E_{A-1}}^B E_{A-1}^B$$

Equation 156 Redistributed earnings on FDI received

$$RFDI_r^B = r_{FDI_A}^B p_{E_{A-1}}^B E_{A-1}^B$$

Equation 157 Redistributed earnings on FDI paid

$$RFDI_p^B = r_{FDI}^B p_{E_L-1}^B E_{L-1}^B$$

Equation 158 Property income attributed to insurance policy holders paid

$$INS_p^B = \sum_i INS_r^i \quad \text{for } i = F, G, H, R$$

Equation 159 Corporate taxes

$$T^B = \theta_T^B (\Pi_{-1}^B + Int_{p-1}^B - Int_{p-1}^B + Div_{p-1}^B - Div_{p-1}^B + RFDI_{r-1}^B \\ - RFDI_{p-1}^B - INS_{p-1}^B)$$

Equation 160 Social contributions received

$$SC_r^B = \theta_{SC}^B (SC_p^H + SC_p^R)$$

Equation 161 Social benefits paid

$$SB_p^B = \theta_{SB_p}^B p_Y Y$$

Equation 162 Miscellaneous transfers received

$$Tr_r^B = \theta_{Tr_r}^B p_Y Y$$

Equation 163 Miscellaneous transfers paid

$$Tr_p^B = \theta_{Tr_p}^B p_Y Y$$

Equation 164 Disposable (corporate) income

$$Y_d^B = \Pi^B + Int_r^B - Int_p^B + Div_p^B - Div_r^B + RFDI_r^B - RFDI_p^B - INS_p^B \\ - T^B + SC_r^B - SB_p^B + Tr_r^B - Tr_p^B$$

Equation 165 Savings

$$S^B = Y_d^B$$

Equation 166 Net acquisition of non-financial non-produced assets

$$NP^B = \theta_{NP}^B p_Y Y$$

Equation 167 Capital transfers received

$$Tr_{K_r}^B = \theta_{Tr_K}^B p_Y Y$$

Equation 168 Financing capacity/need

$$FCN^B = S^B - p_{I_1}^B I_1^B - NP^B + Tr_{K_r}^B$$

Equation 169 Investment (accumulation rate)

$$\left(\frac{I^B}{K_{1-1}^B} \right) = 0.02 + 0.9 \left(\frac{I_{-1}^B}{K_{1-2}^B} \right)$$

Equation 170 Investment, price

$$\Delta \ln(p_I^B) = -0.01 + 1.1 \Delta \ln(p_Y)$$

Equation 171 Produced non-financial assets, price

$$\Delta \ln(p_{K_1}^B) = 0.4 \Delta \ln(p_{K_1-1}^B) + 0.7 \Delta \ln(p_Y)$$

Equation 172 Produced non-financial assets, stock

$$p_{K_1}^B K_1^B = (1 - \delta_{K_1}^B) p_{K_1-1}^B K_{1-1}^B + p_{I_1}^B I_1^B + K_{1-1}^B \Delta p_{K_1}^B + OCV_{K_1}^B$$

Equation 173 Non-produced non-financial assets, price

$$p_{K_2}^B = \psi_{p_{K_2}}^B p_{K_2}^H$$

Equation 174 Non-produced non-financial assets, stock

$$p_{K_2}^B K_2^B = p_{K_2-1}^B K_{2-1}^B + p_{K_2}^B I_2^B + K_{2-1}^B \Delta p_{K_2}^B + OCV_{K_2}^B$$

Equation 175 Non-produced non-financial assets, flow

$$I_2^B \quad \text{exogenous (close to nil)}$$

Financial institutions, other than the central bank

Equation 176 Bills and coins, stock

$$H^B = \psi_H^B p_Y Y$$

Equation 177 Bills and coins, flow

$$\Delta^* H^B = \Delta H^B - OCV_H^B$$

Equation 178 Loans, flow; **closes the row** of the instrument

$$\Delta^* L_A^B = \Delta^* L_L^F + \Delta^* L_L^G + \Delta^* L_L^H + p_{L_L}^R \Delta^* L_L^R - \Delta^* L_A^F - p_{L_A}^R \Delta^* L_A^R - \Delta^* L_A^{CB}$$

Equation 179 Loans, stock

$$L_A^B = L_{A-1}^B + \Delta^* L_A^B + reval_{L_A}^B + OCV_{L_A}^B$$

Equation 180 Loans, revaluation effects (closes reval for this instrument)

$$reval_{L_A}^B = reval_{L_L}^F + reval_{L_L}^G + reval_{L_L}^H + reval_{L_L}^R - reval_{L_A}^F \\ - reval_{L_A}^R - reval_{L_A}^{CB}$$

Equation 181 Loans, other changes in volume (closes OCV for this instrument)

$$OCV_{LA}^B = OCV_{LL}^F + OCV_{LL}^G + OCV_{LL}^H + OCV_{LL}^R - OCV_{LA}^F - OCV_{LA}^R - OCV_{LA}^{CB}$$

Equation 182 Financial derivatives and employee stock options, flow; **closes the row** of the instrument

$$\Delta^* X_L^B = \Delta^* X_A^F + \Delta^* X_A^{CB} + \Delta^* X_A^G + \Delta^* X_A^H - \Delta^* X_L^R$$

Equation 183 Financial derivatives and employee stock options, stock

$$X_L^B = X_{L-1}^B + \Delta^* X_L^B + reval_{X_L}^B + OCV_{X_L}^B$$

Equation 184 Financial derivatives and employee stock options, revaluation effects (closes reval for this instrument)

$$reval_{X_L}^B = reval_{X_A}^F + reval_{X_A}^{CB} + reval_{X_A}^G + reval_{X_A}^H - reval_{X_L}^R$$

Equation 185 Financial derivatives and employee stock options, other changes in volume (closes OCV for this instrument)

$$OCV_{X_L}^B = OCV_{X_A}^F + OCV_{X_A}^{CB} + OCV_{X_A}^G + OCV_{X_A}^H - OCV_{X_L}^R$$

Equation 186 Deposit holdings, stock

$$D_A^B = \psi_D^B p_Y Y$$

Equation 187 Deposit liabilities, flow

$$\Delta^* D_A^B = \Delta D_A^B - reval_{D_A}^B - OCV_{D_A}^B$$

Equation 188 Banks absorb all public debt securities available (model runs with v1)

$$p_{BA}^{B_G} \Delta^* B_A^{B_G} = p_{BL}^G \Delta^* B_L^G - p_{BA}^{CB_G} \Delta^* B_A^{CB_G} - p_{BA}^{F_G} \Delta^* B_A^{F_G} - p_{BA}^{R_G} \Delta^* B_A^{R_G} \quad v1$$

$$\left(\frac{p_{BA}^{B_G} \Delta^* B_A^{B_G}}{p_Y Y} \right) = 0.35 \left(\frac{p_{BA-1}^{B_G} \Delta^* B_{A-1}^{B_G}}{p_{Y-1} Y_{-1}} \right) + 2.3 \left(i_{10yr-1} - i_{-1}^{LT*} + \frac{\Delta NEER_{-1}}{NEER_{-2}} \right) \quad v2$$

Equation 189 Public debt securities held, stock

$$B_A^{B_G} = B_{A-1}^{B_G} + \Delta^* B_A^{B_G} + \left(\frac{OCV_{BA}^{B_G}}{p_{BA}^{B_G}} \right)$$

Equation 190 Public debt securities, price

$$p_{BA}^{B_G} = \psi_{BA}^{B_G} p_{BL}^G$$

Equation 191 Foreign debt securities held, flow (accumulation rate)

$$\left(\frac{\Delta^* B_A^{B_R}}{B_{A-1}^{B_R}} \right) = 0.65 \left(\frac{\Delta^* B_{A-1}^{B_R}}{B_{A-2}^{B_R}} \right) - 3.1 (i_{LTcr-1} - i_{-1}^{LT*})$$

Equation 192 Foreign debt securities held, stock

$$B_A^{B_R} = B_{A-1}^{B_R} + \Delta^* B_A^{B_R} + \left(\frac{OCV_{BA}^{B_R}}{p_{BA}^{B_R}} \right)$$

Equation 193 Foreign debt securities held, price

$$\Delta p_{BA}^{B_R} = \left(\frac{B_{BL-1}^{B_R}}{B_{BA-1}^{B_R}} \right) \Delta p_{BL}^R - \sum_i \left(\frac{B_{BA-1}^{i_R}}{B_{BA-1}^{B_R}} \right) \Delta p_{BA}^{i_R} \quad \text{for } i = F, CB, G, H$$

Equation 194 Demand for other securities

$$\left(\frac{p_{BA}^{B_A} \Delta^* B_A^{B_A}}{p_Y Y} \right) = 0.6 \left(\frac{\Delta Y}{Y_{-1}} \right) + 0.6 r_A^B - 0.6 \left(i_{-1}^* - \frac{\Delta NEER_{-1}}{NEER_{-2}} \right)$$

Equation 195 Other debt securities held, flow

$$B_A^B = B_{A-1}^B + \Delta^* B_A^B + \left(\frac{OCV_{BA}^B}{p_{BA}^B} \right)$$

Equation 196 Other securities held, price

$$\Delta \ln(p_{BA}^B) = 0.2 \Delta \ln(p_{BA-1}^B) + 0.7 \Delta \ln(p_{BL}^G)$$

Equation 197 Equities held, flow (financial accumulation rate)

$$\left(\frac{\Delta^* E_A^B}{E_{A-1}^B} \right) = 0.03 + 0.4 \left(\frac{\Delta^* E_{A-1}^B}{E_{A-2}^B} \right) + 0.05 (r_{EA-1}^B - \pi_{Y-1})$$

Equation 198 Equities held (domestic + foreign), stock

$$E_A^B = E_{A-1}^B + \Delta^* E_A^B + \left(\frac{OCV_{EA}^B}{p_{EA}^B} \right)$$

Equation 199 Equities held, price

$$p_{EA}^B = p_{EA}^{B_{FR}} \left(\frac{p_{EA}^{B_{FR}} E_A^{B_{FR}}}{p_{EA}^B E_A^B} \right) + p_{EA}^{B_R} \left(\frac{p_{EA}^{B_R} E_A^{B_R}}{p_{EA}^B E_A^B} \right)$$

Equation 200 Profitability of equities held

$$r_{EA}^B = \left(\frac{E_{A-1}^B \Delta p_{EA}^B + Div_r^B}{p_{EA-1}^B E_{A-1}^B} \right)$$

Equation 201 Domestic equities held by banks, stock

$$p_{EA}^{B_{FR}} E_A^{B_{FR}} = p_{EA}^B E_A^B - p_{EA}^{B_R} E_A^{B_R}$$

Equation 202 Domestic equities held by banks, flow

$$\Delta^* E_A^{B_{FR}} = \Delta E_A^{B_{FR}} - \left(\frac{OCV_{EA}^{B_{FR}}}{p_{EA}^{B_{FR}}} \right)$$

Equation 203 Domestic equities held by banks, price

$$p_{EA}^{B_{FR}} = \eta_{p_{EA}}^{B_{FR}} p_E^{FR}$$

Equation 204 Foreign equities held by banks, stock

$$\left(\frac{p_{EA}^{B_R} E_A^{B_R}}{p_{EA}^B E_A^B} \right) = 0.03 + 0.86 \left(\frac{p_{EA-1}^{B_R} E_{A-1}^{B_R}}{p_{EA-1}^B E_{A-1}^B} \right) - 0.4 \left(\frac{\Delta NEER}{NEER_{-1}} \right)$$

Equation 205 Foreign equities held by banks, stock

$$\Delta^* E_A^{B_R} = \Delta E_A^{B_R} - \left(\frac{OCV_{EA}^{B_R}}{p_{EA}^{B_R}} \right)$$

Equation 206 Foreign equities held by banks, price

$$\Delta \ln(p_{EA}^{B_R}) = 0.5 \Delta \ln(p_E^*)$$

Equation 207 Bank reserves, flow; **closes the account** of financial institutions excluding the central bank (this version runs with option 1)

Option 1 (QE, 2007-)

$$\begin{aligned}\Delta^* RES &= \Delta^* RF + \Delta^* D_L^B + p_{B_L}^B \Delta^* B_L^B + p_{E_L}^B \Delta^* E_L^B \\ &+ \Delta^* A_L^B - (\Delta^* D_A^B + p_{B_A}^{BG} \Delta^* B_A^{BG} + p_{B_A}^{BR} \Delta^* B_A^{BR} \\ &+ p_{B_A}^B \Delta^* B_A^B + \Delta^* L_A^B + p_{E_A}^B \Delta^* E_A^B + \Delta^* X_A^B \\ &+ \Delta^* Z^B + p_{I_1}^B I_1^B - S^B - T_{K_r}^B + NP^B + Adj^B)\end{aligned}$$

Option 2 (no QE, 1992-2006)

$$\left(\frac{\Delta^* RES}{RES_{-1}}\right) = 1.8 \left(\frac{\Delta^* D_L^B}{D_{L-1}^B}\right)$$

Equation 208 Bank reserves, stock

$$RES = RES_{-1} + \Delta^* RES + OCV_{RES}^B$$

Equation 209 Bank deposits, flow; **closes the row** of the instrument

$$\begin{aligned}\Delta^* D_L^B &= \Delta^* D_A^F + \Delta^* D_A^{CB} + \Delta^* D_A^B + \Delta^* D_A^G + \Delta^* D_A^H + p_{D_A}^B \Delta^* D_A^R \\ &- p_{D_L}^B \Delta^* D_L^R - \Delta^* D_L^{CB} - \Delta^* D_L^G\end{aligned}$$

Equation 210 Deposit liabilities, stock

$$D_L^B = D_{L-1}^B + \Delta^* D_L^B + reval_{D_L}^B + OCV_{D_L}^B$$

Equation 211 Deposit liabilities, revaluation effects (closes reval for this instrument)

$$\begin{aligned}reval_{D_L}^B &= reval_{D_A}^F + reval_{D_A}^B + reval_{D_A}^{CB} + reval_{D_A}^G + reval_{D_A}^H \\ &+ reval_{D_A}^R - reval_{D_L}^R - reval_{D_L}^{CB} - reval_{D_L}^G\end{aligned}$$

Equation 212 Deposit liabilities, other changes in volume (closes OCV for this instrument)

$$\begin{aligned}OCV_{D_L}^B &= OCV_{D_A}^F + OCV_{D_A}^B + OCV_{D_A}^{CB} + OCV_{D_A}^G + OCV_{D_A}^H + OCV_{D_A}^R \\ &- OCV_{D_L}^R - OCV_{D_L}^{CB} - OCV_{D_L}^G\end{aligned}$$

Equation 213 Debt securities issued, closes the instrument

$$\begin{aligned}p_{B_L}^B \Delta^* B_L^B &= p_{B_A}^B \Delta^* B_A^B + p_{B_A}^{CB} \Delta^* B_A^{CB} + p_{B_A}^G \Delta^* B_A^G + p_{B_A}^H \Delta^* B_A^H \\ &+ p_{B_A}^R \Delta^* B_A^R - p_{B_L}^F \Delta^* B_L^F\end{aligned}$$

Equation 214 Debt securities issued, price

$$\Delta p_{B_L}^B = -\left(\frac{B_{L-1}^F}{B_{L-1}^B}\right) \Delta p_{B_L}^F + \sum_i \left(\frac{B_{A-1}^i}{B_{L-1}^B}\right) \Delta p_{B_A}^i \quad \text{for } i = B, CB, G, H, R$$

Equation 215 (Other) debt securities issued, stock

$$B_L^B = B_{L-1}^B + \Delta^* B_L^B + \left(\frac{OCV_{B_L}^B}{p_{B_L}^B}\right)$$

Equation 216 Other securities held, other changes in volume (closes OCV for this instrument)

$$OCV_{B_L}^B = OCV_{B_A}^B + OCV_{B_A}^{CB} + OCV_{B_A}^G + OCV_{B_A}^H + OCV_{B_A}^R - OCV_{B_L}^F$$

Equation 217 Insurance, pension funds and standardized guarantee schemes, flow; **closes the row** of the instrument

$$\Delta^* A_L^B = \Delta^* A_A^F + \Delta^* A_A^G + \Delta^* A_A^H + \Delta^* A_A^R$$

Equation 218 Insurance, pension funds and standardized guarantee schemes, stock

$$A_L^B = A_{L-1}^B + \Delta^* A_L^B + reval_{A_L}^B + OCV_{A_L}^B$$

Equation 219 Insurance, pension funds and standardized guarantee schemes, other changes in volume (closes OCV for this instrument)

$$OCV_{A_L}^B = \sum_i OCV_{A_A}^i \quad \text{for } i = F, G, H, R$$

Equation 220 Equities issued (closes the block equities) → **model runs with option 1**

$$\begin{aligned}p_{E_L}^B \Delta^* E_L^B &= p_{E_A}^{FRR} \Delta^* E_A^{FRR} + p_{E_A}^{BFR} \Delta^* E_A^{BFR} + p_{E_A}^{CBFR} \Delta^* E_A^{CBFR} \\ &+ p_{E_A}^{GFR} \Delta^* E_A^{GFR} + p_{E_A}^{HFR} \Delta^* E_A^{HFR} + p_{E_A}^R \Delta^* E_A^R \\ &- p_{E_L}^F \Delta^* E_L^F - p_{E_L}^{CB} \Delta^* E_L^{CB} \quad v1\end{aligned}$$

$$\left(\frac{p_{E_L}^B \Delta^* E_L^B}{p_Y Y}\right) = 0.25 \left(\frac{p_{E_{L-1}}^B \Delta^* E_{L-1}^B}{p_{Y-1} Y_{-1}}\right) + 0.2 \left(\frac{\Delta^* K_{1-1}^F}{K_{1-2}^F}\right) \quad v2$$

Equation 221 Equities issued, stock

$$E_L^B = E_{L-1}^B + \Delta^* E_L^B + \left(\frac{OCV_{E_L}^B}{p_{E_L}^B}\right)$$

Equation 222 Equities issued, other changes in volume (closes OCV for the instrument)

$$\begin{aligned}OCV_{E_L}^B &= OCV_{E_A}^{FRR} + OCV_{E_A}^{BFR} + OCV_{E_A}^{CBFR} + OCV_{E_A}^{GFR} + OCV_{E_A}^{HFR} \\ &+ OCV_{E_A}^R - OCV_{E_L}^F - OCV_{E_L}^{CB}\end{aligned}$$

Equation 223 Equities issued, price

$$p_{E_L}^B = \theta_{p_{EL}}^B p_E^{FR}$$

Equation 224 Profitability of equities issued

$$r_{E_L}^B = \left(\frac{E_{L-1}^B \Delta p_{E_L}^B + Div_p^B}{p_{E_{L-1}}^B E_{L-1}^B}\right)$$

Equation 225 Other accounts receivable/payable, stock

$$Z^B = \psi_{B_A}^B p_Y Y$$

Equation 226 Other accounts receivable/payable, flow

$$\Delta^* Z^B = \Delta Z^B - OCV_Z^B$$

Equation 227 Financial wealth

$$\begin{aligned}FW^B &= H^B + RES + D_A^B + p_{B_A}^{BG} B_A^{BG} + p_{B_A}^{BR} B_A^{BR} + p_{B_A}^B B_A^B + L_A^B \\ &+ p_{E_A}^B E_A^B + X_A^B + Z^B - RF - D_L^B - p_{B_L}^B B_L^B \\ &- p_{E_L}^B E_L^B - A_L^B\end{aligned}$$

Equation 228 Net wealth

$$WLTH^B = p_{K_1}^B K_1^B + p_{K_{12}}^B K_{12}^B + p_{K_2}^B K_2^B + FW^B$$

Banque de France

Equation 229 Interests paid

$$Int_p^{CB} = r_{CB} RES_{-1} + r_D (D_{L-1}^{CB} + D_{L-1}^{CB})$$

Equation 230 Interests received

$$\begin{aligned}Int_r^{CB} &= r_{CB} RF_{-1} + r_e TGT_{-1} + r_D D_{A-1}^{CB} \\ &+ r_B (p_{B-1}^{CBG} B_{A-1}^{CBG} + p_{B-1}^{CBR} B_{A-1}^{CBR} + p_{B-1}^{CB} B_{A-1}^{CB}) \\ &+ i^{LTCR} L_{A-1}^{CB}\end{aligned}$$

Equation 231 Dividends paid

$$Div_p^{CB} = \gamma_{div_p}^B p_{E_{L-1}}^{CBFR} E_{L-1}^{CBFR}$$

Equation 232 Dividends received

$$Div_r^{CB} = \gamma_{div_r}^B p_{E_{A-1}}^{CB} E_{A-1}^{CB}$$

Equation 233 Profits

$$\Pi^{CB} = Int_r^{CB} - Int_p^{CB} + Div_r^{CB} - Div_p^{CB}$$

Equation 234 Taxes paid to the government

$$T^{CB} = \Pi^{CB}$$

Equation 235 Central bank deposits held by the government

$$D_L^{CBG} = D_A^{GCB}$$

Equation 236 Central bank deposits assets, stock

$$D_A^{CB} = \gamma_{DA}^{CB} p_Y Y$$

Equation 237 Central bank deposits liabilities, stock

$$D_L^{CB} = \gamma_{DL}^{CB} p_Y Y$$

Equation 238 Central bank deposits (assets and liabilities), flow

$$\Delta^* D_i^{CB} = \Delta D_i^{CB} - reval_{D_i}^{CB} - OCV_{D_i}^{CB} \quad \text{for } i = A, L$$

Equation 239 Central bank deposits assets, other changes in volume

$$OCV_{DA}^{CB} = \alpha_{FORRES} OCV_{FORRES}$$

Equation 240 Bills and coins, flow; **closes the row** of the instrument

$$\Delta^* H = \Delta^* H^F + \Delta^* H^B + \Delta^* H^H + \Delta^* H^R$$

Equation 241 Bills and coins, stock

$$H = H_{-1} + \Delta^* H + OCV_H$$

Equation 242 Bills and coins, other changes in volume (closes OCV for this instrument)

$$OCV_H = \sum_i OCV_H^i \quad \text{for } i = F, B, H, R$$

Equation 243 Public bonds bought by the central bank (QE), flow

$$p_{BA}^{CBG} \Delta^* B_A^{CBG} = \gamma_{BA}^{CBG} p_Y Y$$

Equation 244 Public bonds bought by the central bank (QE), stock

$$B_A^{CBG} = B_{A-1}^{CBG} + \Delta^* B_A^{CBG} + \left(\frac{OCV_{BA}^{CBG}}{p_{BA}^{CBG}} \right)$$

Equation 245 Price of public bonds bought by the central bank

$$p_{BA}^{CBG} = \gamma_{p_{BA}}^{CBG} p_{BL}^G$$

Equation 246 Foreign bonds bought by the central bank, stock

$$p_{BA}^{CBR} B_A^{CBR} = \gamma_{BA}^{CBR} p_Y Y$$

Equation 247 Foreign bonds bought by the central bank, flow

$$\Delta^* B_A^{CBR} = \Delta B_A^{CBR} - \left(\frac{OCV_{BA}^{CBR}}{p_{BA}^{CBR}} \right)$$

Equation 248 Price of foreign bonds bought by the central bank

$$p_{BA}^{CBR} = \gamma_{p_{BA}}^{CBR} p_{BL}^R$$

Equation 249 Other bonds bought by the central bank (QE), flow

$$p_{BA}^{CB} \Delta^* B_A^{CB} = \gamma_{BA}^{CB} p_Y Y$$

Equation 250 Other bonds bought by the central bank (QE), stock

$$B_A^{CB} = B_{A-1}^{CB} + \Delta^* B_A^{CB} + \left(\frac{OCV_{BA}^{CB}}{p_{BA}^{CB}} \right)$$

Equation 251 Other bonds held by the central bank, price

$$p_{BA}^{CB} = \gamma_{p_{BA}}^{CB} p_{BL}^G$$

Equation 252 Purchase of bank credit, flow

$$\Delta^* L_A^{CB} = \gamma_{LA}^{CB} p_Y Y$$

Equation 253 Purchase of bank credit, stock

$$L_A^{CB} = L_{A-1}^{CB} + \Delta^* L_A^{CB} + reval_{LA}^{CB} + OCV_{LA}^{CB}$$

Equation 254 Refinancing, flow (this version runs with option 1)

Option 1 (QE, 2007-)

$$\Delta^* RF = \Delta^* RF^{CB} - \Delta^* RF^R$$

Option 2 (no QE, 1992-2006)

$$\begin{aligned} \Delta^* RF = & \Delta^* RES - \Delta^* D_L^B - p_{BL}^B \Delta^* B_L^B - p_{EL}^B \Delta^* E_L^B - \Delta^* A_L^B \\ & + (\Delta^* D_A^B + p_{BA}^{BG} \Delta^* B_A^{BG} + p_{BA}^{BR} \Delta^* B_A^{BR} \\ & + p_{BA}^{CB} \Delta^* B_A^{CB} + \Delta^* L_A^B + p_{EA}^{CB} \Delta^* E_A^{CB} + \Delta^* X_A^B \\ & + \Delta^* Z^B + p_{I1}^B I_1^B - S^B - T_{Kr}^B + NP^B + Adj^B) \end{aligned}$$

Equation 255 Refinancing, stock

$$RF = RF_{-1} + \Delta^* RF + OCV_{RF}$$

Equation 256 Refinancing, other changes in volume (closes OCV for this instrument)

$$OCV_{RF} = OCV_{RF}^{CB} - OCV_{RF}^R$$

Equation 257 Refinancing by the central bank, flow

$$\Delta^* RF^{CB} = \phi_{RF}^{CB} p_Y Y$$

Equation 258 Refinancing by the central bank, stock

$$RF^{CB} = RF_{-1}^{CB} + \Delta^* RF^{CB} + OCV_{RF}^{CB}$$

Equation 259 Domestic equities held, flow

$$p_{EA}^{CBFR} \Delta^* E_A^{CBFR} = \phi_{EA}^{CBFR} p_Y Y$$

Equation 260 Domestic equities held, stock

$$E_A^{CBFR} = E_{A-1}^{CBFR} + \Delta^* E_A^{CBFR} + \left(\frac{OCV_{EA}^{CBFR}}{p_{EA}^{CBFR}} \right)$$

Equation 261 Domestic equities held, price

$$p_{EA}^{CBFR} \quad \text{exogenous}$$

Equation 262 Foreign equities held, flow

$$p_{EA}^{CBR} \Delta^* E_A^{CBR} = \phi_{EA}^{CBR} p_Y Y$$

Equation 263 Foreign equities held, stock

$$E_A^{CBR} = E_{A-1}^{CBR} + \Delta^* E_A^{CBR} + \left(\frac{OCV_{EA}^{CBR}}{p_{EA}^{CBR}} \right)$$

Equation 264 Foreign equities held, price

$$p_{EA}^{CBR} \text{ exogenous}$$

Equation 265

$$p_{EA}^{CB} \Delta^* E_A^{CB} = p_{EA}^{CBR} \Delta^* E_A^{CBR} + p_{EA}^{CBFR} \Delta^* E_A^{CBFR}$$

Equation 266 Other accounts payable/receivable

$$Z_A^{CB} \text{ exogenous}$$

Equation 267 Equity issued, stock

$$p_{EL}^{CB} E_L^{CB} \text{ exogenous}$$

Equation 268 Equity issued, flow

$$\Delta^* E_L^{CB} = \Delta E_L^{CB} - \left(\frac{OCV_{EL}^{CB}}{p_{EL}^{CB}} \right)$$

Equation 269 Equity issued, price

$$p_{EL}^{CB} = \phi_E^{CB} p_E^{FR}$$

Equation 270 Net wealth = financial wealth

$$\begin{aligned} WLTH^{CB} = FW^{CB} = & p_G^{CB} G^{CB} + RF^{CB} + TRGT2 + D_A^{CB} + p_{BA}^{CBG} B_A^{CBG} \\ & + p_{BA}^{CBR} B_A^{CBR} + p_{BA}^{CB} B_A^{CB} + L_A^{CB} + p_E^{CB} E_A^{CB} \\ & + X_A^{CB} + Z_A^{CB} - H - RES - D_L^{CBG} - D_L^{CB} \\ & - p_{EL}^{CB} E_L^{CB} \end{aligned}$$

Equation 271 Central bank's accounting equilibrium (system's unwritten identity)

$$\begin{aligned} p_G^{CB} \Delta^* G^{CB} + \Delta TRGT2 + \Delta^* RF^{CB} + \Delta^* D_A^{CB} + p_{BA}^{CBG} \Delta^* B_A^{CBG} \\ + p_{BA}^{CBR} \Delta^* B_A^{CBR} + p_{BA}^{CB} \Delta^* B_A^{CB} + \Delta^* L_A^{CB} \\ + p_E^{CB} \Delta^* E_A^{CB} \\ = \Delta^* H + \Delta^* RES + \Delta^* D_L^{CB} + \Delta^* D_L^{CBG} + p_{EL}^{CB} \Delta^* E_L^{CB} \\ + Adj^{CB} \end{aligned}$$

Government

Equation 272 Wages paid by the public sector

$$W_p^G = w_p^G N^G$$

Equation 273 Labor contributions paid

$$LC_p^G = \beta_{LC}^G W_p^G$$

Equation 274 Labor taxes paid

$$T_L^G = \beta_{TL}^G W_p^G$$

Equation 275 Labor taxes received

$$T_L = \sum_i T_L^i - T_L^R \text{ for } i = F, B, CB, G, H$$

[Operating surplus of the public sector $\rightarrow \Pi^G = VA^G - W_p^G - LC_p^G - T_L^G + Sub_r^G$]

Equation 276 Subsidies on production

$$Sub = \beta_{Sub}^G VA$$

Equation 277 Value added taxes

$$T^P = \gamma_{TP} VA$$

Equation 278 Interests received

$$Int_r^G = r_A^G (D_{A-1}^G + p_{BA}^G B_{A-1}^G) + r_D D_{A-1}^{CBG}$$

Equation 279 Interests paid

$$Int_p^G = r_L^G (D_{L-1}^G + p_{BL-1}^G B_{L-1}^G + L_{L-1}^G)$$

Equation 280 Dividends received

$$Div_r^G = \gamma_{div}^G p_{EA-1}^G E_{A-1}^G$$

Equation 281 Rents received

$$RENT_r^G = rent_r^G p_{K2-1}^G K_{2-1}^G$$

Equation 282 Income taxes received

$$T = \sum_i T^i \text{ for } i = F, B, CB, H, R$$

Equation 283 Social contributions received

$$SC_r^G = SC_p^H + SC_p^R - \sum_i SC_r^i \text{ for } i = F, B, R$$

Equation 284 Social benefits paid

$$SB_p^G = \theta_{SB_p}^G p_Y Y$$

Equation 285 Miscellaneous transfers paid

$$Tr_p^G = \beta_{Trp}^G p_Y Y$$

Equation 286 Disposable income

$$\begin{aligned} Y_d^G = & VA^G - W_p^G - LC_p^G - T_L^G + Sub_r^G + T_p + Int_r^G - Int_p^G + Div_r^G \\ & + INS_r^G + RENT_r^G + T + SC_r^G - SB_p^G - Tr_p^G \\ & + T_L + Sub + Sub_r^{G'} + T^{CB} \end{aligned}$$

Equation 287 Current public spending (collective and individual)

$$C^G = \beta_C^G Y$$

Equation 288 Price of current public expenditure

$$\Delta \ln(p_C^G) = 1.02 \Delta \ln(p_C^H)$$

Equation 289 Savings (current public balance)

$$S^G = Y_d^G - p_C^G C^G$$

Equation 290 Capital transfers paid

$$Tr_{Kp}^G = Tr_{Kp}^F + Tr_{Kp}^B + Tr_{Kp}^R - Tr_{Kp}^H - Tr_{Kp}^R$$

Equation 291 Acquisitions less disposals of non-financial non-produced assets

$$NP^G = \beta_{NP}^G p_Y Y$$

Equation 292 Financing capacity/need

$$FCN^G = S^G - p_{I_1}^G I_1^G - p_{I_{12}}^G I_{12}^G - NP^G - Tr_{K_p}^G$$

Equation 293 Investment

$$I_1^G = \beta_{I_1}^G Y$$

Equation 294 Investment, price

$$\Delta \ln(p_I^G) = 1.1 \Delta \ln(p_Y)$$

Equation 295 Produced non-financial assets, price

$$\Delta \ln(p_{K_1}^G) = 0.3 \Delta \ln(p_{K_1-1}^G) + 0.6 \Delta \ln(p_I^G)$$

Equation 296 Produced non-financial assets, stock

$$p_{K_1}^G K_1^G = (1 - \delta_{K_1}^G) p_{K_1-1}^G K_{1-1}^G + p_{K_1}^G I_1^G + K_{1-1}^G \Delta p_{K_1}^G + OCV_{K_1}^G$$

Equation 297 Non-produced non-financial assets, price

$$p_{K_2}^G = \psi_{p_{K_2}}^G p_{K_2}^H$$

Equation 298 Non-produced non-financial assets, stock

$$p_{K_2}^G K_2^G = p_{K_2-1}^G K_{2-1}^G + p_{K_2}^G I_2^G + K_{2-1}^G \Delta p_{K_2}^G + OCV_{K_2}^G$$

Equation 299 Government's account vis-à-vis the central bank, stock

$$D_A^{GCB} = \psi_{D_A}^{GCB} VA^G$$

Equation 300 Government's account vis-à-vis the central bank, flow

$$\Delta^* D_A^{GCB} = \Delta D_A^{GCB} - OCV_{D_A}^{GCB}$$

Equation 301 Deposits received by the government, stock

$$D_L^G = \psi_{D_L}^G (D_A^G - hm)$$

Equation 302 Deposits received by the government, flow

$$\Delta^* D_L^G = \Delta D_L^G - reval_{D_L}^G - OCV_{D_L}^G$$

Equation 303 Deposits, stock

$$D_A^G = \psi_{D_A}^G VA^G$$

Equation 304 Deposits, flow

$$\Delta^* D_A^G = \Delta D_A^G - reval_{D_A}^G - OCV_{D_A}^G$$

Equation 305 Foreign securities held by the government, stock

$$p_{B_A}^{G_R} B_A^{G_R} = \psi_{p_{B_A}}^{G_R} p_Y Y$$

Equation 306 Foreign securities held by the government, flow

$$\Delta^* B_A^{G_R} = \Delta B_A^{G_R} - \left(\frac{OCV_{B_A}^{G_R}}{p_{B_A}^{G_R}} \right)$$

Equation 307 Foreign securities held by the government, price

$$p_{B_A}^{G_R} = \psi_{p_{B_A}}^{G_R} p_{B_L}^R$$

Equation 308 Other securities held by the government, stock

$$p_{B_A}^G B_A^G \text{ exogenous}$$

Equation 309 Other securities held by the government, flow

$$\Delta^* B_A^G = \Delta B_A^G - \left(\frac{OCV_{B_A}^G}{p_{B_A}^G} \right)$$

Equation 310 Other securities held by the government, price

$$p_{B_A}^G = \psi_{p_{B_A}}^G p_{B_L}^R$$

Equation 311 Equity held, stock

$$p_{E_A}^G E_A^G = \psi_{p_{E_A}}^G p_Y Y$$

Equation 312 Equity held, price

$$p_{E_A}^G = p_{E_A}^{G_{FR}} \left(\frac{p_{E_A}^{G_{FR}} E_A^{G_{FR}}}{p_{E_A}^G E_A^G} \right) + p_{E_A}^{G_R} \left(\frac{p_{E_A}^{G_R} E_A^{G_R}}{p_{E_A}^G E_A^G} \right)$$

Equation 313 Equity held, flow

$$\Delta^* E_A^G = \Delta E_A^G - \left(\frac{OCV_{E_A}^G}{p_{E_A}^G} \right)$$

Equation 314 Domestic equities held by the government, stock

$$p_{E_A}^{G_{FR}} E_A^{G_{FR}} = \psi_{p_{E_A}}^G p_{E_A}^G E_A^G$$

Equation 315 Domestic equities held by the government, flow

$$\Delta^* E_A^{G_{FR}} = \Delta E_A^{G_{FR}} - \left(\frac{OCV_{E_A}^{G_{FR}}}{p_{E_A}^{G_{FR}}} \right)$$

Equation 316 Domestic equities held by the government, price

$$\Delta \ln(p_{E_A}^{G_{FR}}) = 0.4 \Delta \ln(p_E^{FR}) - 0.5 v c_{-1}$$

$$v c = \ln(p_{E_A}^{G_{FR}}) + 0.32 - 0.3 \ln(p_E^{FR})$$

Equation 317 Foreign equities held by the government, stock

$$p_{E_A}^{G_R} E_A^{G_R} = p_{E_A}^G E_A^G - p_{E_A}^{G_{FR}} E_A^{G_{FR}}$$

Equation 318 Foreign equities held by the government, price

$$p_{E_A}^{G_R} \text{ exogenous}$$

Equation 319 Foreign equities held government, flow

$$\Delta^* E_A^{G_R} = \Delta E_A^{G_R} - \left(\frac{OCV_{E_A}^{G_R}}{p_{E_A}^{G_R}} \right)$$

Equation 320 Profitability of equities held

$$r_{E_A}^G = \left(\frac{E_{A-1}^G \Delta p_{E_A}^G + Div_r^G}{p_{E_{A-1}}^G E_{A-1}^G} \right)$$

Equation 321 Financial derivatives held by the government, stock

$$X_A^G = \psi_{X_A}^G VA^G$$

Equation 322 Financial derivatives held by the government, flow

$$\Delta^* X_A^G = \Delta X_A^G - reval_{X_A}^G - OCV_{X_A}^G$$

Equation 323 Total public indebtedness, flow; **closes the account of the government**

$$\begin{aligned} p_{BL}^G \Delta^* BL_L^G &= \Delta^* D_A^{GCB} + \Delta^* D_A^G + p_{BA}^G \Delta^* B_{BA}^G + p_{BA}^{GR} \Delta^* B_{BA}^{GR} + p_{EA}^G \Delta^* E_A^G \\ &\quad + \Delta^* A_A^G + \Delta^* X_A^G + \Delta^* Z^G - \Delta^* D_L^G + p_{I1}^G I_1^G \\ &\quad + p_{I12}^G I_{12}^G - S^G + Tr_{Kp}^G + NP^G - Adj^G \end{aligned}$$

Equation 324 Public bonds (model runs with $v1$)

$$\ln(p_{BL}^G) = -0.39 + 0.1 \ln\left(\frac{1}{r_L^G}\right) \quad v1$$

p_{BL}^G exogenous $v2$

Equation 325 Total public indebtedness, stock

$$BL_L^G = BL_{L-1}^G + \Delta^* BL_L^G + \left(\frac{OCV_{BL}^G}{p_{BL}^G}\right)$$

Equation 326 Total public indebtedness, price

$$\Delta \ln(p_{BL}^G) = 0.82 \Delta \ln(p_{BL}^G)$$

Equation 327 Bonds issued, stock

$$p_{BL}^G B_L^G = \psi_{BL}^G p_{BL}^G B_L^G \{ = \psi_{BL}^G (p_{BL}^G B_L^G + L_L^G) \}$$

Equation 328 Bonds issued, price

$$p_{BL}^G \text{ exogenous}$$

Equation 329 Public debt securities held, other changes in volume (closes OCV for this instrument)

$$OCV_{BL}^G = OCV_{BA}^{BG} + OCV_{BA}^{CBG} + OCV_{BA}^{FG} + OCV_{BA}^{RG}$$

Equation 330 Bonds issued, flow

$$\Delta^* B_L^G = \Delta B_L^G - \left(\frac{OCV_{BL}^G}{p_{BL}^G}\right)$$

Equation 331 Credit demand, flow

$$\Delta^* L_L^G = p_{BL}^G \Delta^* B_L^G - p_{BL}^G \Delta^* B_L^G$$

Equation 332 Credit demand, stock

$$L_L^G = L_{L-1}^G + \Delta^* L_L^G + reval_{LL}^G + OCV_{LL}^G$$

Equation 333 Insurance, pension funds and guarantee schemes, stock

$$A_A^G = \psi_A^G p_Y Y$$

Equation 334 Insurance, pension funds and guarantee schemes, flow

$$\Delta^* A_A^G = \Delta A_A^G - reval_{AA}^G - OCV_{AA}^G$$

Equation 335 Other accounts payable/receivable, stock

$$Z^G = \psi_A^G p_Y Y$$

Equation 336 Other accounts payable/receivable, flow

$$\Delta^* Z^G = \Delta Z^G - OCV_Z^G$$

Equation 337 Financial wealth

$$\begin{aligned} FW^G &= D_A^{GCB} + D_A^G + p_{BA}^{GR} B_{BA}^{GR} + p_{BA}^G B_{BA}^G + p_{EA}^G E_A^G + A_A^G + X_A^G + Z^G \\ &\quad - D_L^G - p_{BL}^G B_L^G - L_L^G \end{aligned}$$

Equation 338 Net wealth

$$WLTH^G = p_{K1}^G K_1^G + p_{K12}^G K_{12}^G + p_{K2}^G K_2^G + FW^G$$

Rest of the world

Equation 339 Labor contributions paid

$$LC_p^R = \beta_{LC}^R W_p^R$$

Equation 340 Import taxes (on value added), paid as a fraction of imports

$$T_P^R = \theta_{TP}^R p_{IM} IM$$

Equation 341 Wages paid

$$W_p^R \text{ exogenous}$$

Equation 342 Subsidies

$$Sub_p^R = \beta_{Subp}^R p_Y Y$$

Equation 343 Interests received

$$Int_r^R = r_A^R (D_{A-1}^R + p_{BA-1}^{RG} B_{A-1}^{RG} + p_{BA-1}^R B_{A-1}^R + L_{A-1}^R)$$

Equation 344 Interests paid

$$Int_p^R = r_L^R (D_{L-1}^R + p_{BL-1}^R B_{L-1}^R + L_{L-1}^R) + r_e TGT_{2-1}$$

Equation 345 Dividends paid

$$Div_p^R = \gamma_{Divp}^R p_{EL-1}^R E_{L-1}^R$$

Equation 346 Dividends received

$$\begin{aligned} Div_r^R &= Div_p^R + Div_p^B + Div_p^{CB} + Div_p^R - Div_r^F - Div_r^B - Div_r^{CB} \\ &\quad - Div_r^G - Div_r^H \end{aligned}$$

Equation 347 Reinvested earnings on FDI paid

$$RFDI_p^R = r_{FDI}^R p_{EL-1}^R E_{L-1}^R$$

Equation 348 Reinvested earnings on FDI received

$$RFDI_r^R = r_{FDI}^R p_{EA-1}^R E_{A-1}^R$$

Equation 349 Property income attributed to insurance policy holders received

$$INS_r^R = r_{AA}^R A_{A-1}^R$$

Equation 350 Import duties (paid on foreign income)

$$T^R \text{ exogenous}$$

Equation 351 Social benefits received

$$SB_r^R = \beta_{SB_r}^R p_Y Y$$

Equation 352 Social benefits paid

$$SB_p^R = \beta_{SB_p}^R p_Y Y$$

Equation 353 Social contributions received

$$SC_r^R = \theta_{SC}^R (SC_p^H + SC_p^R)$$

Equation 354 Exports of goods and services (volume)

$$\Delta \ln(X) = 0.3\Delta \ln(X_{-1}) + 0.4\Delta \ln(Y^f) - 0.2\Delta \ln\left(\frac{p_X}{p_{X^*}}\right) - 0.14vc_{-1}$$

$$vc = \ln(X) - 1.7 - 0.6\ln(Y^f) + 0.5\ln\left(\frac{p_X}{p_{X^*}}\right)$$

Equation 355 Price of exports of goods and services

$$\ln(p_X) = 0.03 + 0.5\ln(p_{X^*}) + 0.3\ln(p_Y)$$

Equation 356 Imports of goods and services (volume)

$$\Delta \ln(IM) = 2.2\Delta \ln(Y) + 0.5vc_{-1}$$

$$vc = \ln(IM) - 1.8\ln(Y) + 0.2\ln(p_{IM}) + 8.5 - 0.01t$$

Equation 357 Price of imports of goods and services

$$\Delta \ln(p_{IM}) = 0.12\Delta \ln(p_{IM-1}) + 0.7\Delta \ln(p_{MSH}) - 0.45vc_{-1}$$

$$vc = \ln(p_{IM}) - 0.6\ln(p_{MSH})$$

Equation 358 Financing capacity/need $\rightarrow (-)$ current account

$$\begin{aligned} FCN^R = & p_{IM}IM - p_XX + W_r^R - W_p^R + LC_r^R - LC_p^R + T_L^R - Sub_r^R \\ & - Sub_p^R + T_p^R + Int_r^R - Int_p^R + Div_r^R - Div_p^R \\ & + RFDI_r^R - RFDI_p^R + INS_r^R - T^R + SC_r^R \\ & + SB_r^R + Tr_r^R + Tr_{K_p}^R - Tr_{K_r}^R \end{aligned}$$

$$\begin{aligned} FCN^R = & p_{IM}IM - p_XX + \theta_{ROW} + W_r^R - W_p^R + LC_r^R - LC_p^R - Sub_r^R \\ & + Tr_{K_p}^R - Tr_{K_r}^R \end{aligned}$$

Equation 359 Unwritten equilibrium of goods and services with the rest of the world ($S - I - \text{Current account} = 0$)

$$\sum_i FCN^i = 0 \quad \text{for } i = F, B, G, H, R$$

Equation 360 Bills and coins, stock (0 before 2002)

$$H^R = \eta_H p_Y Y$$

Equation 361 Bills and coins, flow

$$\Delta^* H^R = \Delta H^R - OCV_H^R$$

Equation 362 Deposits held by foreigners, flow (accumulation rate)

$$\left(\frac{\Delta^* D_A^R}{D_{A-1}^R}\right) = 2.9\left(\frac{\Delta Y}{Y_{-1}}\right) + 2\left(i_{-1}^D - i_{-1}^{D^*} + \frac{\Delta NEER_{-1}}{NEER_{-2}}\right)$$

Equation 363 Deposits held by foreigners, stock

$$D_A^R = D_{A-1}^R + \Delta^* D_A^R + OCV_{D_A}^R$$

Equation 364 Refinancing, flow

$$\Delta^* RF^R \text{ exogenous}$$

Equation 365 Refinancing, stock

$$RF^R = RF_{-1}^R + \Delta^* RF^R + OCV_{RF}^R$$

Equation 366 Public debt securities held by the RoW, flow

$$\begin{aligned} \left(\frac{\Delta^* B_A^{RG}}{B_{A-1}^{RG}}\right) = & 0.04 - 0.14\left(\frac{\Delta^* B_{A-1}^{RG}}{B_{A-2}^{RG}}\right) + 2.2\left(\frac{\Delta Y}{Y_{-1}}\right) \\ & + 3.9\left(i_{10yr} - i^{LT^*} + \frac{\Delta NEER}{NEER_{-1}}\right) \end{aligned}$$

Equation 367 Public debt securities held by the RoW, stock

$$B_A^{RG} = B_{A-1}^{RG} + \Delta^* B_A^{RG} + \left(\frac{OCV_{B_A}^{RG}}{p_{B_A}^{RG}}\right)$$

Equation 368 Public debt securities held by the RoW, price

$$\Delta p_{B_A}^{RG} = \left(\frac{B_{A-1}^G}{B_{A-1}^{RG}}\right)\Delta p_{B_L}^G - \sum_i \left(\frac{B_{A-1}^{iG}}{B_{A-1}^{RG}}\right)\Delta p_{B_A}^{iG} \quad \text{for } i = F, B, CB$$

Equation 369 Other debt securities held by the RoW, flow

$$\begin{aligned} \left(\frac{\Delta^* B_A^R}{B_{A-1}^R}\right) = & 0.34\left(\frac{\Delta^* B_{A-1}^R}{B_{A-2}^R}\right) + 2.2\left(\frac{\Delta Y}{Y_{-1}}\right) \\ & + 3.1\left(i_{10yr} - i^{LT^*} + \frac{\Delta NEER}{NEER_{-1}}\right) \end{aligned}$$

Equation 370 Other debt securities held by the RoW, price

$$p_{B_A}^R = \eta_{p_{B_A}} p_{B_L}^B$$

Equation 371 Other debt securities held by the RoW, stock

$$B_A^R = B_{A-1}^R + \Delta^* B_A^R + \left(\frac{OCV_{B_A}^R}{p_{B_A}^R}\right)$$

Equation 372 Loans held by the RoW, flow

$$\left(\frac{\Delta^* L_A^R}{L_{A-1}^R}\right) = 0.03 + 1.2\left(\frac{\Delta Y}{Y_{-1}}\right) + 1.3\left(i^{LTcr} - i^{LT^*} + \frac{\Delta NEER}{NEER_{-1}}\right)$$

Equation 373 Loans held by the RoW, stock

$$L_A^R = L_{A-1}^R + \Delta^* L_A^R + OCV_{L_A}^R$$

Equation 374 Domestic equities held by the RoW, flow (includes inward FDI)

$$\left(\frac{\Delta^* E_A^R}{E_{A-1}^R}\right) = 0.04 + 0.05(r_{E_A}^R - \pi_Y) + 0.6\left(\frac{\Delta Y_{-1}}{Y_{-2}}\right)$$

Equation 375 Equities, flow-stock

$$\Delta E_A^R = \Delta^* E_A^R + \left(\frac{OCV_{E_A}^R}{p_{E_A}^R}\right)$$

Equation 376 Equities held by the RoW, price

$$\begin{aligned} \Delta p_{E_A}^R = & \sum_i \left(\frac{E_{A-1}^i}{E_{A-1}^R}\right)\Delta p_{E_L}^i - \sum_j \left(\frac{E_{A-1}^{jFR}}{E_{A-1}^R}\right)\Delta p_{E_A}^{jFR} \quad \text{for } i \\ & = F, B, CB \quad \& \quad j = F, B, CB, G, H \end{aligned}$$

Equation 377 Profitability of equities held by the RoW

$$r_{E_A}^R = \left(\frac{E_{A-1}^R \Delta p_{E_A}^R + Div_r^R}{p_{E_{A-1}}^R E_{A-1}^R}\right)$$

Equation 378 Insurance, pension funds and standardized guarantee schemes held by the RoW, stock

$$A_A^R = \eta_{AR} p_Y Y$$

Equation 379 Insurance, pension funds and standardized guarantee schemes held by the RoW, flow

$$\Delta^* A_A^R = \Delta A_A^R - OCV_{A_A}^R$$

Equation 380 Financial derivatives and employee stock options, stock (net)

$$X_A^R = \eta_{X_A}^R p_Y Y$$

Equation 381 Financial derivatives and employee stock options, flow (net)

$$\Delta^* X_A^R = \Delta X_A^R - OCV_{XA}^R$$

Equation 382 Deposits received by the RoW, stock

$$D_L^R = D_{L-1}^R + \Delta^* D_L^R + reval_{DL}^R + OCV_{DL}^R$$

Equation 383 Deposits received by RoW, **closes the rest of the world's account**

$$\begin{aligned} \Delta^* D_L^R = & \Delta^* H^R + \Delta^* D_A^R + p_{BA}^{RG} \Delta^* B_A^{RG} + p_{BA}^R \Delta^* B_A^R + \Delta^* L_A^R + p_{EA}^R \Delta^* E_A^R \\ & + \Delta^* A_A^R + \Delta^* Z^R - Adj^R - FCN^R - p_G^{CB} \Delta^* G^{CB} \\ & - \Delta^* R^{FR} - p_{BL}^R \Delta^* B_L^R - \Delta^* L_L^R - p_{EL}^R \Delta^* E_L^R \\ & - \Delta^* X_L^R \end{aligned}$$

Equation 384 Debt securities issued by the RoW, flow; **closes the line** foreign debt securities

$$\begin{aligned} p_{BL}^R \Delta^* B_L^R = & p_{BA}^{CB} \Delta^* B_A^{CB} + p_{BA}^{BR} \Delta^* B_A^{BR} + p_{BA}^{GR} \Delta^* B_A^{GR} + p_{BA}^F \Delta^* B_A^{FR} \\ & + p_{BA}^{HR} \Delta^* B_A^{HR} \end{aligned}$$

Equation 385 Debt securities issued by the RoW, price (χr = bilateral €/€ exchange rate)

$$p_{BL}^R = p_B * \chi r$$

Equation 386 Debt securities issued by the RoW, stock

$$B_L^R = B_{L-1}^R + \Delta^* B_L^R + \left(\frac{OCV_{BL}^R}{p_{BL}^R} \right)$$

Equation 387 Debt securities issued by the RoW, other changes in volume (closes OCV for this instrument)

$$OCV_{BL}^R = \sum_i OCV_{BA}^{iR} \quad \text{for } i = F, B, CB, G, H$$

Equation 388 Credit demand by the RoW, flow (accumulation rate)

$$\left(\frac{\Delta^* L_L^R}{L_{L-1}^R} \right) = 1.9 \left(\frac{\Delta Y^*}{Y_{-1}^*} \right)$$

Equation 389 Credit demand by the RoW, stock

$$L_L^R = L_{L-1}^R + \Delta^* L_L^R + reval_{LL}^R + OCV_{LL}^R$$

Equation 390 Foreign equities held by domestic agents, stock (includes outward FDI)

$$E_L^R = E_{L-1}^R + \Delta^* E_L^R + \left(\frac{OCV_{EL}^R}{p_{EL}^R} \right)$$

Equation 391 Foreign equities held by domestic agents, flow (includes outward FDI), value

$$\begin{aligned} p_{EL}^R \Delta^* E_L^R = & p_{EA}^{FR} \Delta^* E_A^{FR} + p_{EA}^{BR} \Delta^* E_A^{BR} + p_{EA}^{CB} \Delta^* E_A^{CB} + p_{EA}^{GR} \Delta^* E_A^{GR} \\ & + p_{EA}^{HR} \Delta^* E_A^{HR} \end{aligned}$$

Equation 392 Foreign equities held by domestic agents, flow (includes outward FDI), volume

$$\Delta^* E_L^R = \left(\frac{p_{EL}^R \Delta^* E_L^R}{p_{EL}^R} \right)$$

Equation 393 Foreign equities held by domestic agents, other changes in volume (closes OCV for this instrument)

$$OCV_{EL}^R = \sum_i OCV_{EA}^{iR} \quad \text{for } i = F, B, CB, G, H$$

Equation 394 Foreign equities held by domestic agents, price (includes outward FDI)

$$\Delta p_{EL}^R = \sum_i \left(\frac{E_{A-1}^{iR}}{E_{L-1}^R} \right) \Delta p_{EA}^{iR} \quad \text{for } i = F, B, CB, G, H$$

Equation 395 Profitability of equities issued by the RoW

$$r_{EL}^R = \left(\frac{E_{L-1}^R \Delta p_{EL}^R + Div_p^R}{p_{EL-1}^R E_{L-1}^R} \right)$$

Equation 396 Target 2

$$TRGT2 \quad \text{exogenous}$$

Equation 397 Monetary gold and Special Drawing Rights, stock

$$G^{CB} = G_{-1}^{CB} + \Delta^* G^{CB} + \left(\frac{OCV_G^{CB}}{p_G^{CB}} \right)$$

Equation 398 Monetary gold and Special Drawing Rights, flow

$$p_G^{CB} \Delta^* G^{CB} \quad \text{exogenous}$$

Equation 399 Monetary gold and Special Drawing Rights, price

$$\Delta \ln(p_G^{CB}) = 0.5 \Delta \ln(p_{gold}) - 0.5 v_{c-1}$$

$$v_c = \ln(p_G^{CB}) - 0.98 \ln(p_{gold})$$

Equation 400 Other accounts payable/receivable, stock

$$Z^R = Z_{-1}^R + \Delta^* Z^R + OCV_Z^R$$

Equation 401 Other accounts payable/receivable, flow; closes the instrument

$$\Delta^* Z^R = - \sum_i \Delta^* Z^i \quad \text{for } i = F, B, G, H$$

Equation 402 Other accounts payable/receivable, other changes in volume (closes OCV for this instrument)

$$OCV_Z^R = - \sum_i OCV_Z^i \quad \text{for } i = F, B, G, H$$

Equation 403 Net wealth

$$\begin{aligned} WLTH^R = & H^R + p_{DA}^R D_A^R + R^{FR} + p_{BA}^{RG} B_A^{RG} + p_{BA}^R B_A^R + L_A^R + p_{EA}^R E_A^R \\ & + A_A^R + X_A^R + Z^R - p_G^{CB} G^{CB} - p_{DL}^R D_L^R \\ & - TRGT2 - p_{BL}^R B_L^R - L_L^R - p_{EL}^R E_L^R \end{aligned}$$

Prices, wages, employment and interest rates

Equation 404 General price index

$$\Delta \ln(p_Y) = 0.01 + 0.4 \Delta \ln(ULC) + 0.3 GAP + 0.03 \Delta \ln(p_{IM-1}) - 0.4 v_{c-1}$$

$$v_c = \ln(p_Y) - 0.4 - 0.9 \ln(ULC)$$

Equation 405 Unit labor costs, market sector

$$ULC^M = \left(\frac{W^M + LC^M + LCW_p^{HM} + T_L^M}{va^M} \right)$$

Note: $LC^M = LC_p^F + LC_p^B + LC_p^H$ and $T_L^M = T_{L_p}^F + T_{L_p}^B + T_{L_p}^H$ and $LCW_p^{HM} = \theta_{SC}^H W^M$

Equation 406 Wages paid, market sector

$$W^M = W^M N^{SM}$$

Equation 407 Total wages paid in France

$$W = W^M + W_p^G$$

Equation 408 Employment in the market sector (salaried + non-salaried)

$$\Delta \ln(N^M) = 0.5\Delta \ln(N_{-1}^M) + 0.5\Delta \ln(va^M) - 0.08vc_{-1}$$

$vc *$

$$= \ln(N^M) - \left(\frac{\ln(va^M) - 0.8 - 0.5 \ln(K_1^M) - 0.014t + 0.01t_{1992}}{1 - 0.5} \right)$$

Equation 409 Non-salaried workers (total household employment = salaried + non-salaried), market sector

$$N^{NS} = N^M - N^{SM}$$

Equation 410 Salaried employment, share of total employment (market sector)

$$\ln\left(\frac{N^{SM}}{N^M}\right) = 3.9 + 0.009t - 0.01t_{2000-2019}$$

Equation 411 Firms' workers

$$N^F = N^M - N^B - N^H$$

Equation 412 Total employment

$$N = N^M + N^G$$

Equation 413 Salaried workers, households

$$N^{HS} = N^H - N^{NS}$$

Equation 414 Public sector (i.e. non-market sector) workers

$$N^G = N^{NM} \text{ exogenous}$$

Equation 415 Banks and households workers

$$N^i = \gamma_N^i N^M \text{ for } i = B, H$$

Equation 416 Wage per worker, market sector

$$\begin{aligned} \Delta \ln\left(\frac{W^M}{N^{SM}}\right) &= \Delta \ln(w^M) \\ &= 0.005 + 0.5\Delta \ln(w_{-1}^M) + 0.4\Delta \ln(p_C^H) \\ &\quad + 0.43\Delta \ln\left(\frac{va^M}{N^M}\right) - 0.38\Delta \ln\left(\frac{va_{-1}^M}{N_{-1}^M}\right) \\ &\quad - 0.2vc_{-1} \\ vc &= \ln(w^M) - 0.9\Delta \ln(p_C^H) + 0.1 \ln(u) - 0.7\Delta \ln\left(\frac{va^M}{N^M}\right) \end{aligned}$$

Equation 417 Wage per worker paid by firms

$$\Delta \ln(w_p^F) = 0.4\Delta \ln(w_{p-1}^F) + 1.01\Delta \ln(w^M) - 0.4\Delta \ln(w_{-1}^M)$$

Equation 418 Wage per worker paid by banks

$$\Delta \ln(w_p^B) = 1.06\Delta \ln(w^M) - 0.17vc_{-1}$$

$$vc = \ln(w_p^B) + 1 - 1.12 \ln(w^M)$$

Equation 419 Wage per worker paid by the public sector

$$\Delta \ln(w_p^G) = 0.45\Delta \ln(w_{p-1}^G) + 0.53\Delta \ln(w^M) - 0.17vc_{-1}$$

$$vc = \ln(w_p^G) + 0.2 - 1.02 \ln(w^M)$$

Equation 420 Output gap

$$gap = \left(\frac{va^M - va^{pM}}{va^{pM}} \right)$$

Equation 421 Potential output; potential value added in volume (model runs with option 2)

Option 1

$$\left(\frac{va^{pM}}{K_1^M} \right) = \theta_t^{pM}$$

Option 2

$$\ln\left(\frac{va^{pM}}{N^M}\right) = 0.8 + 0.5 \ln\left(\frac{K_1^M}{N^M}\right) + 0.014t - 0.01t_{1992-2019}$$

Equation 422 Produced non-financial assets of the market sector, stock

$$K_1^M = K_1^F + K_1^B + K_1^H$$

Equation 423 Unemployment (number of unemployed)

$$U = AP - N$$

Equation 424 Unemployment rate

$$u = \left(\frac{U}{AP} \right)$$

Equation 425 Active population

$$\Delta \ln(AP) = 0.4\Delta \ln(N) + 0.4\Delta \ln(TAP) - 0.2vc_{-1}$$

$$vc = \ln(AP) - 0.37 \ln(N) - 0.56 \ln(TAP) - 0.002t$$

Equation 426 Interest rate received by firms

$$r_A^F = 3.6 + 0.63r_e$$

Equation 427 Interest rate received by households

$$r_A^H = 1.6 + 0.5r_e$$

Equation 428 Interest rate paid by firms

$$r_L^F = 1.6 + 0.7i_{10yrs}$$

Equation 429 Interest rate received by banks

$$r_A^B = 0.4 + 0.5r_{A-1}^B + 0.4i_{10yrs}$$

Equation 430 Interest rate paid by banks

$$r_L^B = 0.9 + 0.9i_{10yrs}$$

Equation 431 Interest rate received by the government

$$r_A^G = 2.5 + 1.6r_\epsilon$$

Equation 432 Interest rate paid by the government

$$r_L^G = 0.9 + 0.85i_{10yrs}$$

Equation 433 Interest rate paid by households

$$r_L^H = 0.9i_{10yrs}$$

Equation 434 Interest rate received by the rest of the world

$$r_A^R = i_{10years} + \kappa_{rA}^R$$

Equation 435 Interest rate on credit, long-term

$$i^{LTcr} = 0.93i_{10yrs}$$

Equation 436 Interest rate on deposits, short-term

$$r_D = 1.4 + 0.5r_\epsilon$$

Equation 437 Interest rate ECB

$$r_\epsilon = r_{CB}$$

Equation 438 Long-term interest rate, 10 years (OECD)

$$i^{LTcr} = 0.93i_{10yrs}$$

Exogenous parameters and variables

Note: exogenous parameters change over time (thus, they do not have a single-value), depending on the values of the variables of the corresponding equations they belong to. Example, α_{VA}^H (in Equation 5) is calculated as $\alpha_{VA}^H = VA^H / (VA - VA^B - VA^G)$, so that the parameter varies across periods. In the projections, they are given the last value.

$$\begin{aligned} &\alpha_{VA}^H, \alpha_{VA}^B, \alpha_{VA}^G, \beta_{LC}^F, \beta_{TL}^F, \gamma_{divp}^F, \gamma_{divr}^F, r_{FDI}^F, r_{AA}^F, rent_p^F, \theta_T^F, \gamma_{SBp}^F, \theta_{SC}^F, \theta_{Trp}^F, \theta_{NPp}^F, \theta_{TrK_r}^F, \theta_{PK_1}^F, \delta_{K_1}^F, \psi_{pBA}^{FG}, \psi_{F2}^F, \psi_{pBA}^{FR}, \psi_{pEA}^{FR}, \eta_{pEA}^{FR}, \psi_H^F, \psi_{AA}^F, \theta_Z^F, \theta_{PEL}^F, \beta_{LC}^H, \beta_{TL}^H, \\ &\beta_{Subs_r}^H, \gamma_{divr}^H, r_{AA}^H, rent_p^H, \theta_T^H, \theta_{SC}^H, \theta_{SBp}^H, \theta_{NPp}^H, \theta_{TrK_r}^H, \delta_{K_1}^H, \psi_H^H, \psi_{BA}^{HR}, \psi_{pBA}^{HR}, \psi_{BA}^H, \psi_{pBA}^H, \eta_{pEA}^{HFR}, \psi_Z^H, \beta_{LC}^B, \beta_{TL}^B, \beta_{Sub_r}^B, \gamma_{divp}^B, \gamma_{divr}^B, r_{FDI}^B, r_{FDI}^B, \theta_T^B, \theta_{SC}^B, \theta_{SBp}^B, \theta_{Tr_r}^B, \\ &\theta_{Trp}^B, \theta_{NPp}^B, \theta_{TrK_r}^B, \delta_{K_1}^B, \psi_{PK_2}^B, \psi_H^B, \psi_D^B, \psi_{BA}^{BG}, \psi_{BA}^{BR}, \psi_{EA}^{BG}, \psi_{EA}^{BR}, \eta_{pEA}^{BFR}, \theta_{PEL}^B, \psi_{BA}^{BG}, \kappa_{rA}^H, \kappa_{rA}^F, \kappa_{rL}^B, \kappa_{rL}^G, \kappa_{rL}^H, \kappa_{rA}^R, \gamma_{DA}^{CB}, \gamma_{DL}^{CB}, \alpha_{FORRES}, \gamma_{pBA}^{CBG}, \gamma_{pBA}^{CBR}, \gamma_{BA}^B, \gamma_{pBA}^{CB}, \gamma_{LA}^{CB}, \\ &\varphi_{RF}^{CB}, \varphi_{EA}^{CBFR}, \varphi_{EA}^{CBR}, \varphi_E^{CB}, \varphi_E^{CB}, \beta_{LC}^G, \beta_{TL}^G, \beta_{Sub}^G, \gamma_{TP}^G, \gamma_{divr}^G, rent_p^G, \theta_{SBp}^G, \beta_G^G, \beta_{NP}^G, \beta_{I_1}^G, \psi_{PK_2}^G, \psi_{DA}^{GCB}, \psi_{DL}^G, \psi_{DA}^G, \psi_{BA}^{GR}, \psi_{pBA}^{GR}, \psi_{pBA}^G, \psi_E^G, \psi_{AA}^G, \psi_{BA}^G, \psi_A^G, \beta_{LC}^R, \theta_{Trp}^R, \\ &\beta_{Subp}^R, \gamma_{divr}^R, r_{FDI}^R, r_{FDI}^R, r_{AA}^R, \beta_{SBp}^R, \beta_{SC}^R, \eta_H, \eta_{RF}, \eta_{BA}^R, \eta_{pBA}^R, \eta_{AR}, \eta_{XA}^R, \eta_{DL}^R, \eta_{OCV_{DL}}^{R2}, p_B, \eta_{LL}^R, \gamma_N^I, \theta_t^{PM} \end{aligned}$$

Exogenous variables: $Sub_r^F, I_2^F, p_{EA}^{HR}, I_2^B, p_{EA}^{CBFR}, p_{BA}^G, B_A^G, p_{EA}^{GR}, p_{BL}^G, W_p^R, T^R, \Delta^* RFR, TRGT2, p_G^{CB} \Delta^* G^{CB}, N^G, N^{NM}$

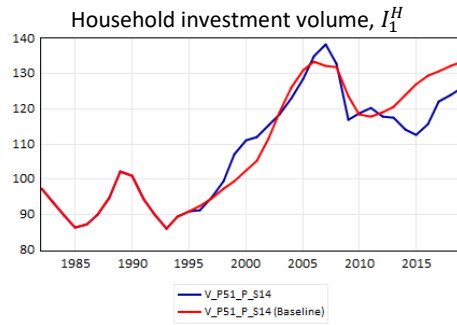
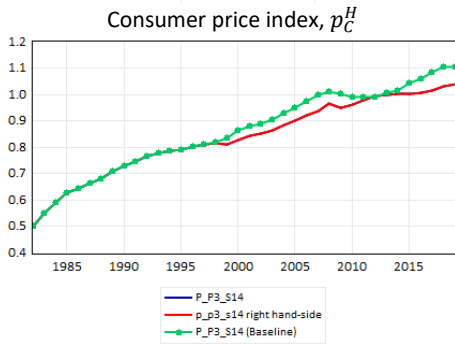
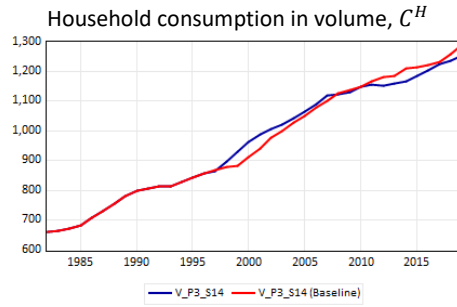
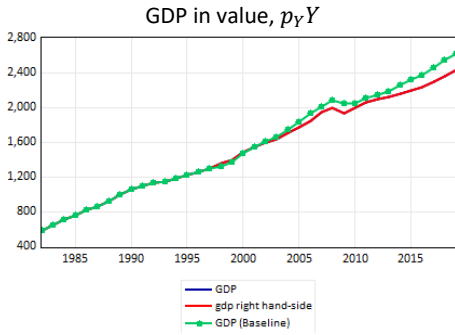
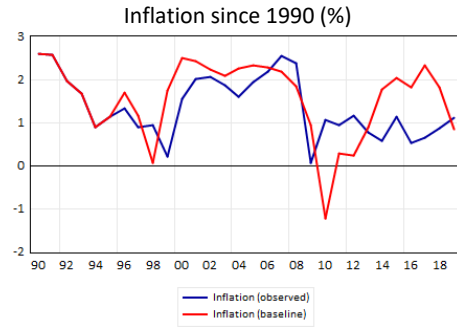
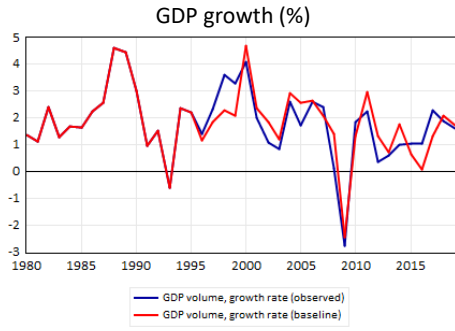
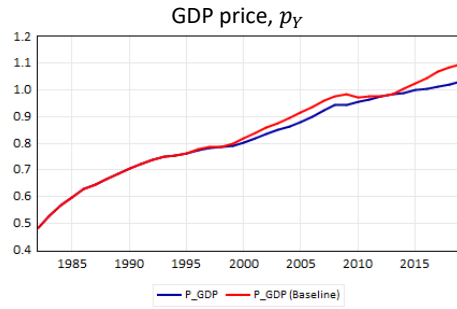
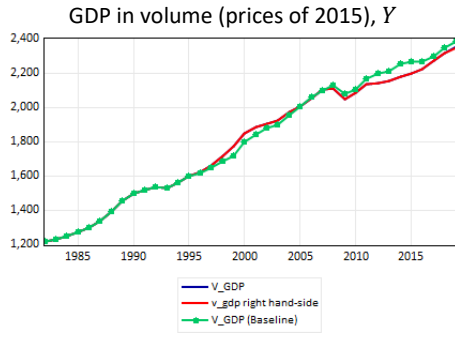
Simulations

Observed vs simulated

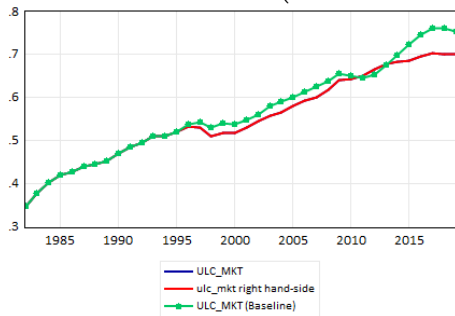
Figure 1 GDP and components

Observed vs baseline, simulations start in 1996 solved with Newton's algorithm

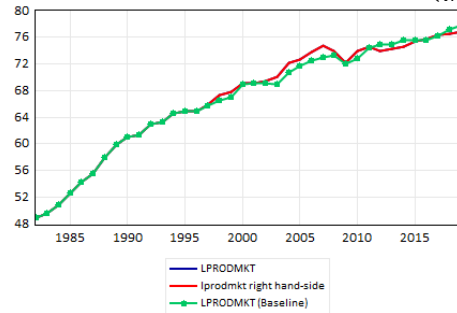
The graphs for behavioral equations ($p_Y, C^H, I_1^H, \Delta^* K_1^F, X, p_X, IM, p_{IM}$) display the observed series (blue) and the simulated series (red). The graphs of the remaining series (mainly the identities $Y, p_Y Y, p_C^H, GAP$ and other ratios) display observed left-hand side of the equation (blue), observed right-hand side (red) and simulated series (green).

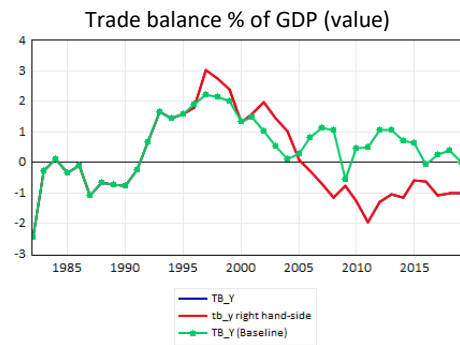
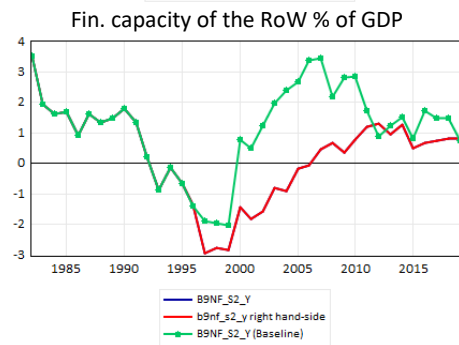
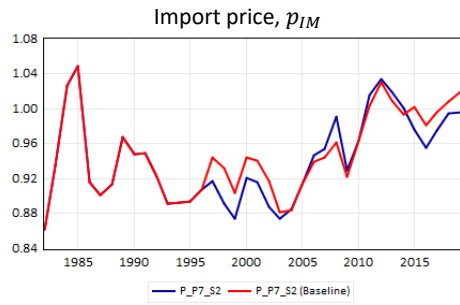
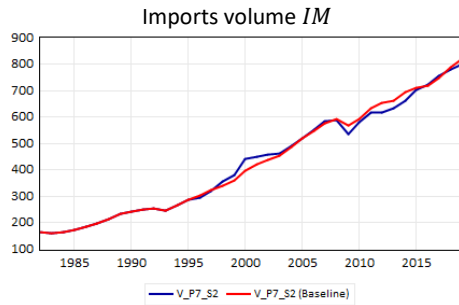
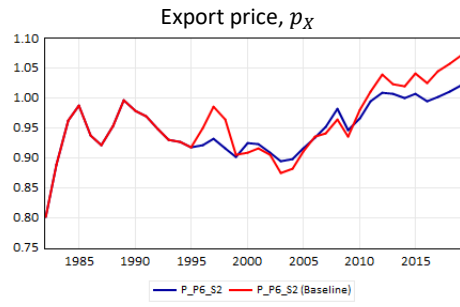
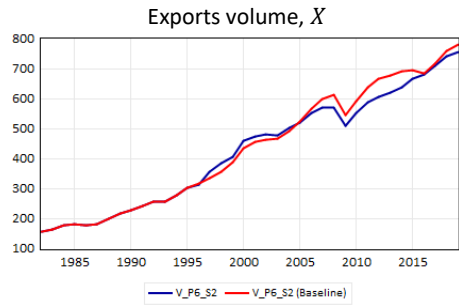
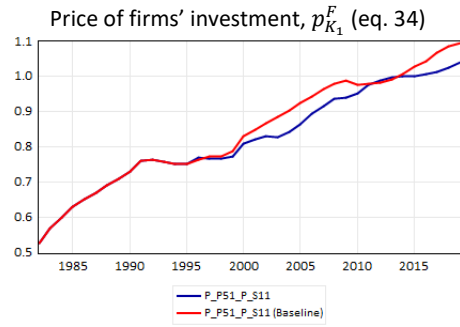
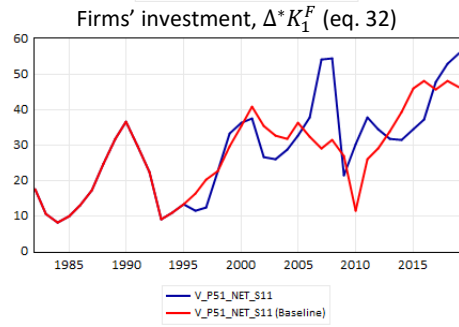
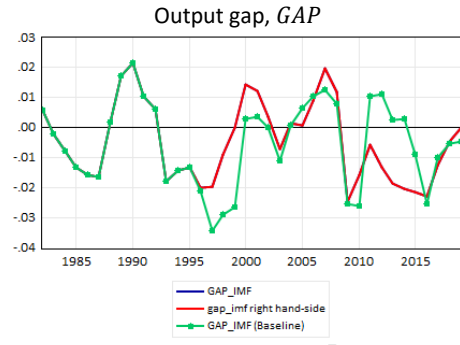


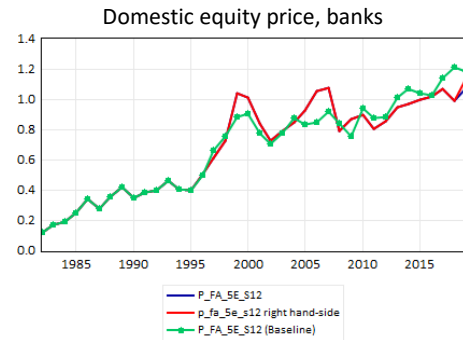
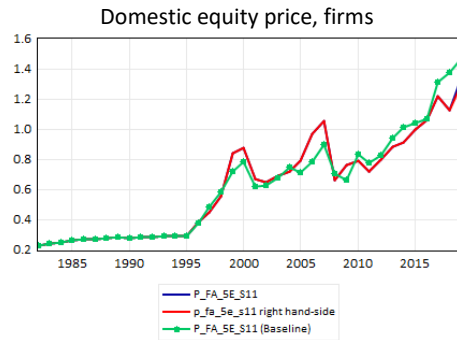
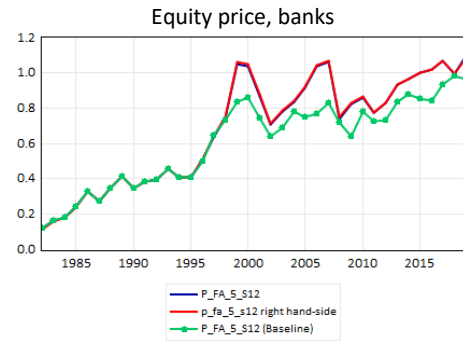
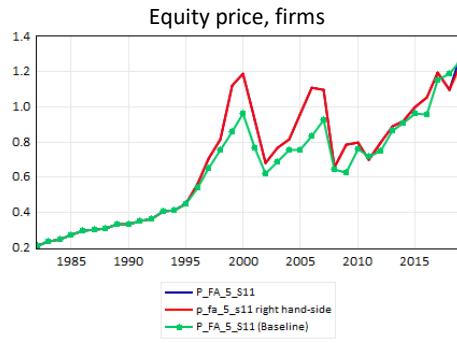
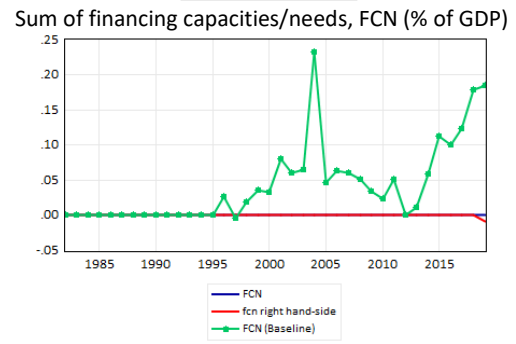
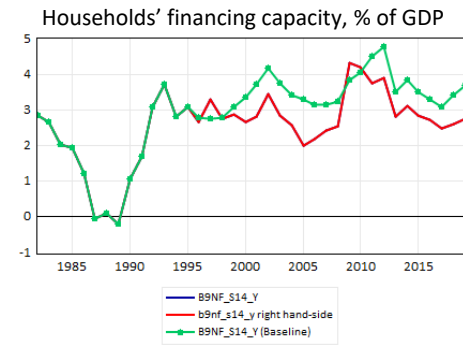
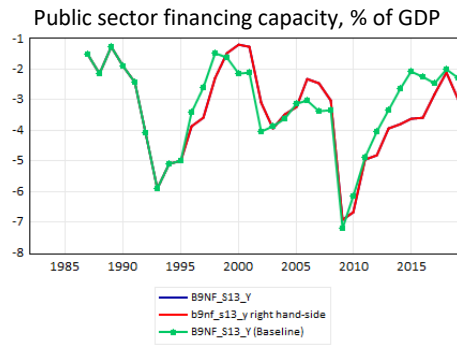
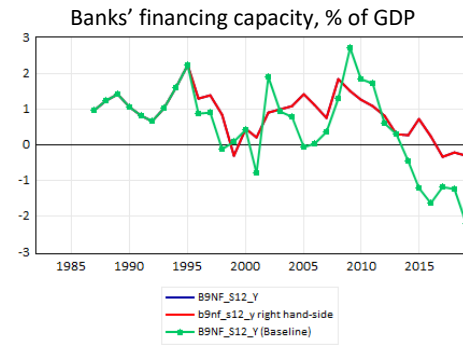
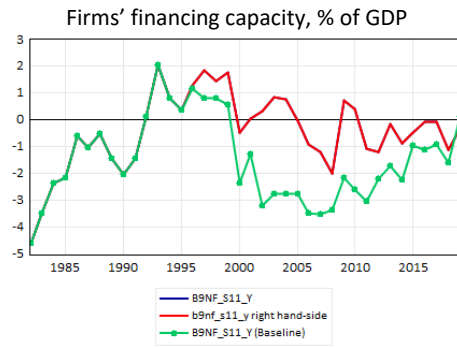
Unit labor costs, market sector $\left(\frac{W^M + LC^M + LCW_p^H M + T_L^M}{va^M} \right)$



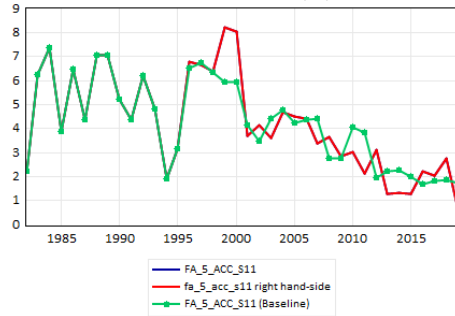
Labor productivity market sector, thousands $\left(\frac{va^M}{N^M} \right)$



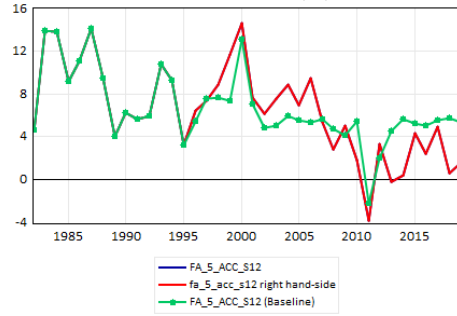




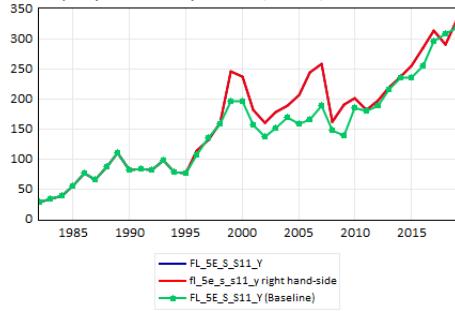
Fin. accumulation rate (%), firms



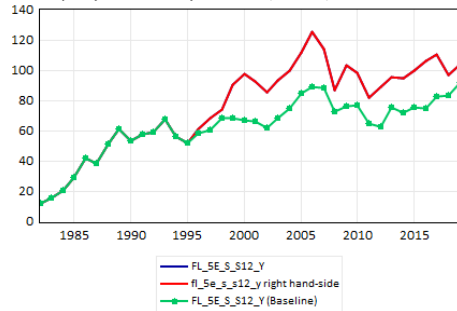
Fin. accumulation rate (%), banks



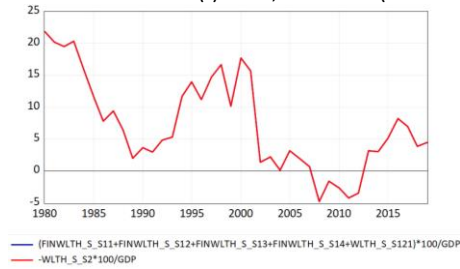
Equity issued by firms (stock), % of GDP



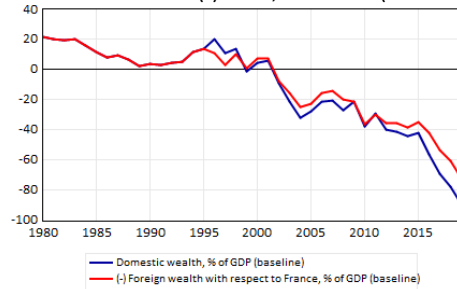
Equity issued by banks (stock), % of GDP



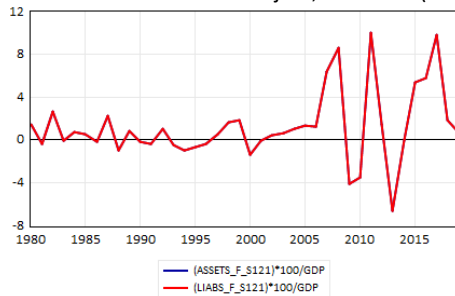
Domestic wealth and (-) RoW, % of GDP (observed)



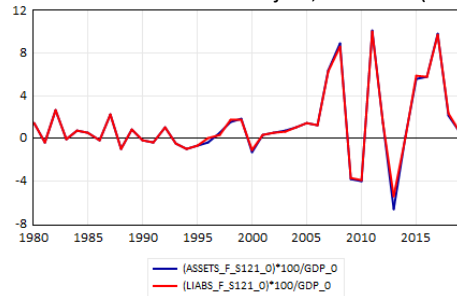
Domestic wealth and (-) RoW, % of GDP (simulated)



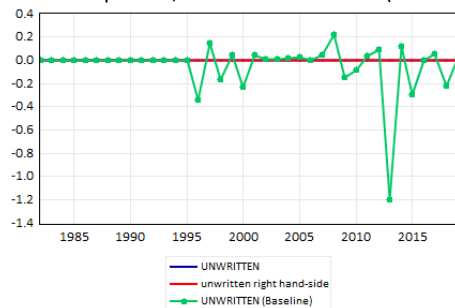
Flow of assets & flow of liabs + adj CB; % of GDP (observed)



Flow of assets & flow of liabs + adj CB; % of GDP (simulated)



Unwritten equation, assets-liabilities BdF (% of GDP)



Scenarios

Figure 2 Scenarios vs baseline (shocks start in 2021)

Baseline series compared to after-shock series (%), simulations start in 2019 solved with Newton's algorithm

Top left → 1% increase in firms' accumulation rate / 5% increase in household consumption / 5% in wage per worker growth

Top right → permanent 1% increase in the interest rate (10 year treasury & ECB rate + 10 year)

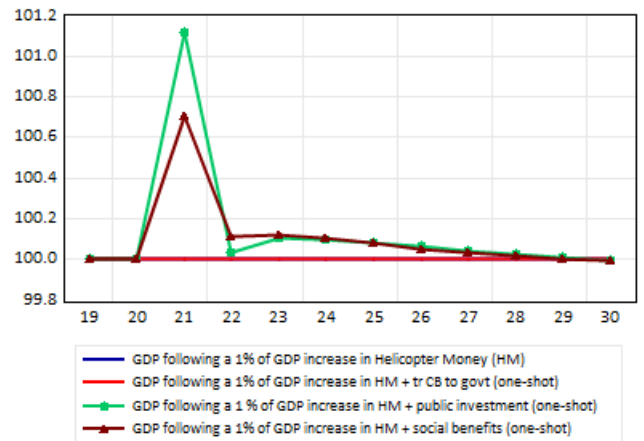
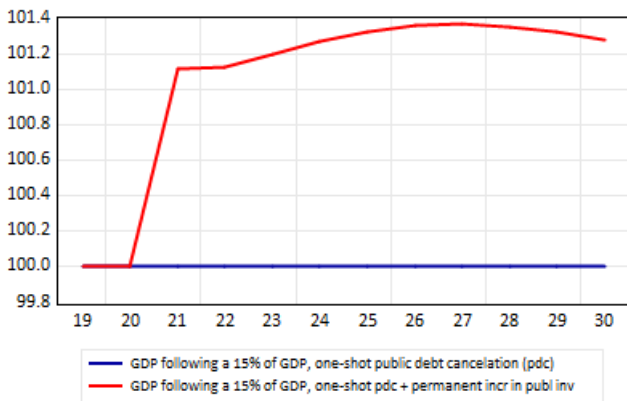
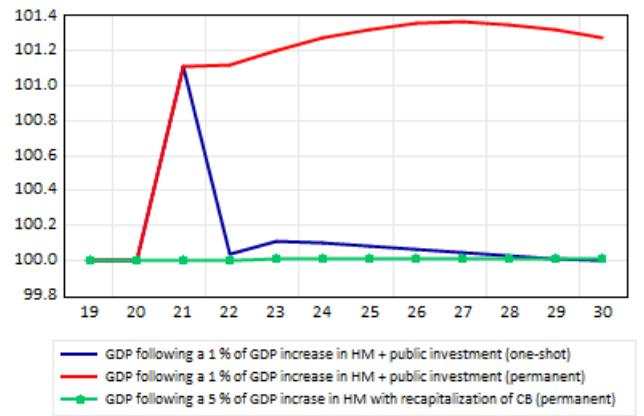
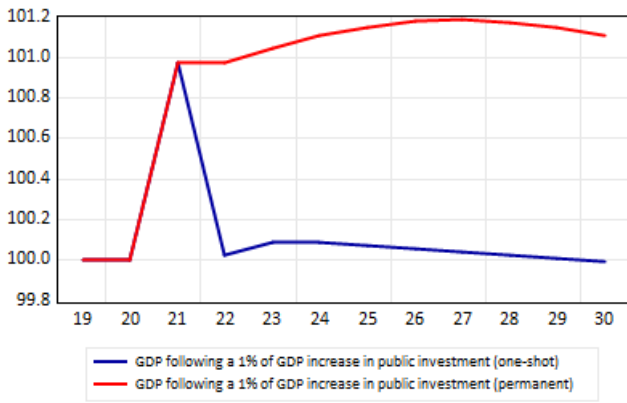
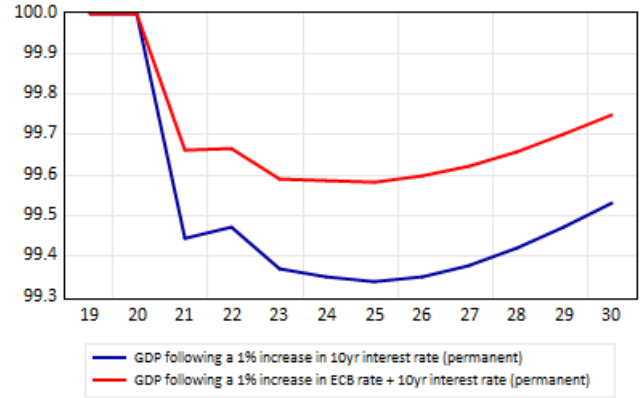
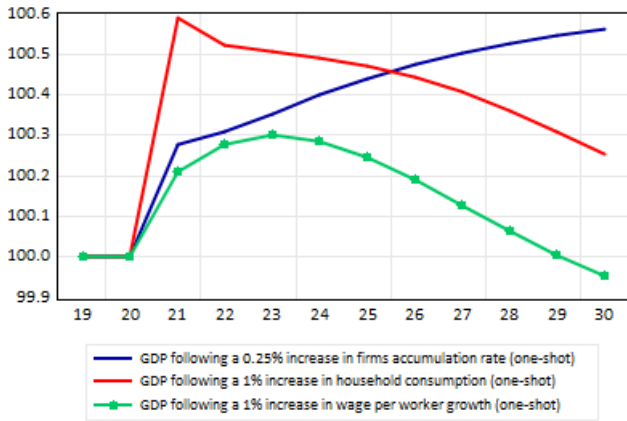
Middle left → 5% of GDP increase in public investment (permanent + one-shot)

Middle right → 5% of GDP increase in helicopter money with public investment (permanent + one-shot) / 5% of GDP recapitalization

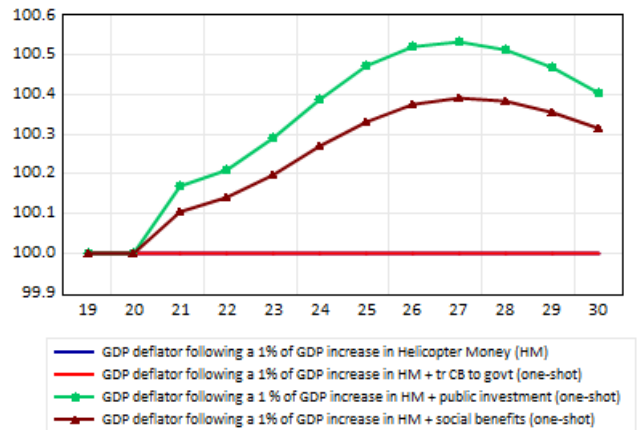
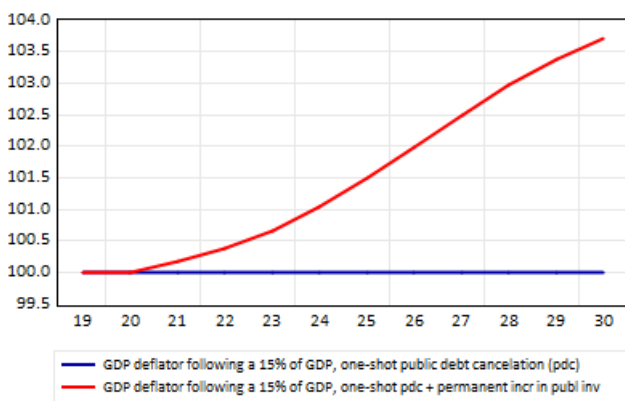
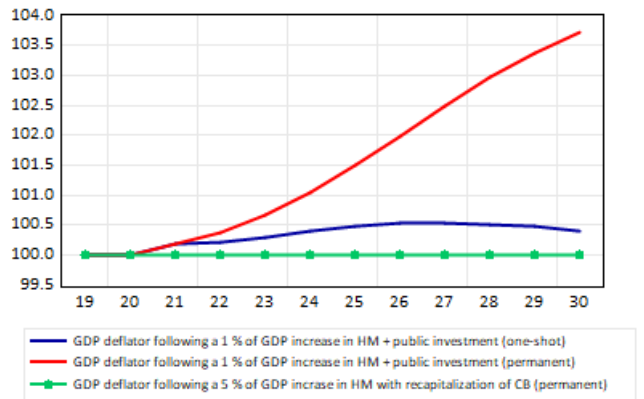
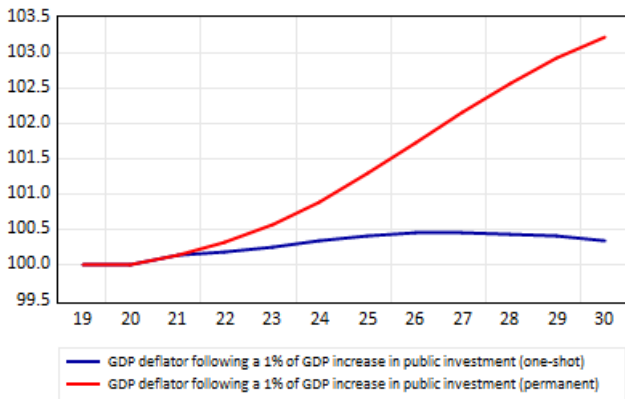
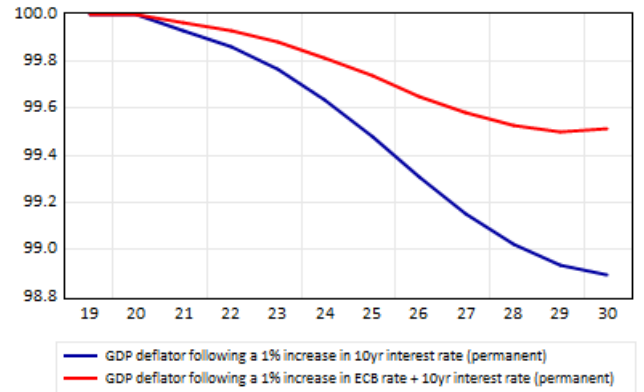
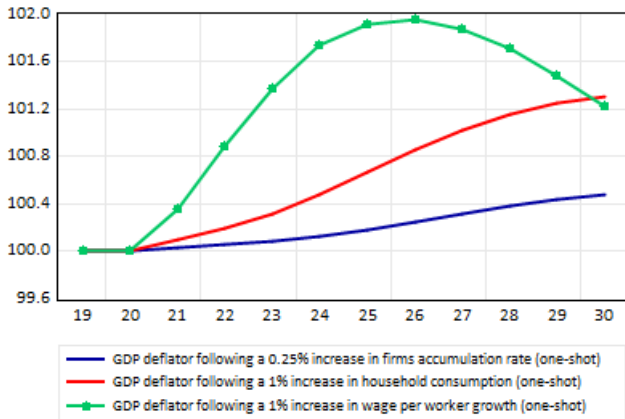
Bottom left → 15% of GDP public debt cancellation (pure v 5% of GDP increase in public investment)

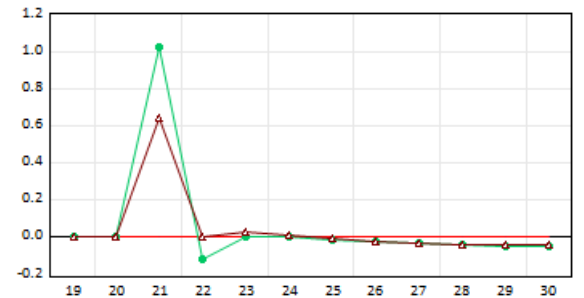
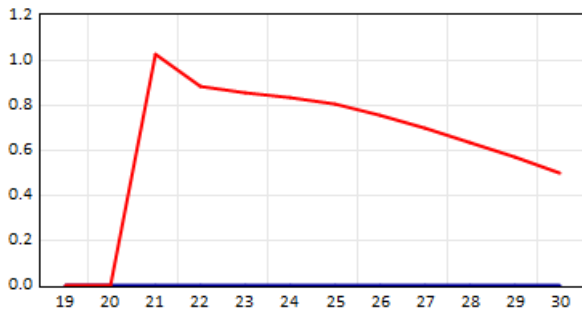
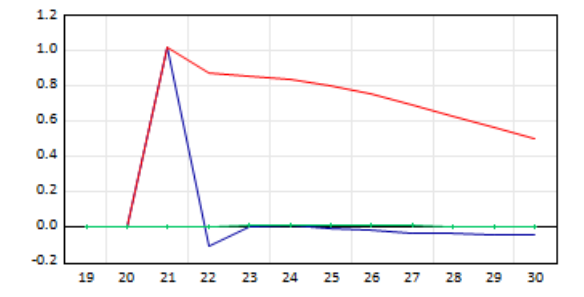
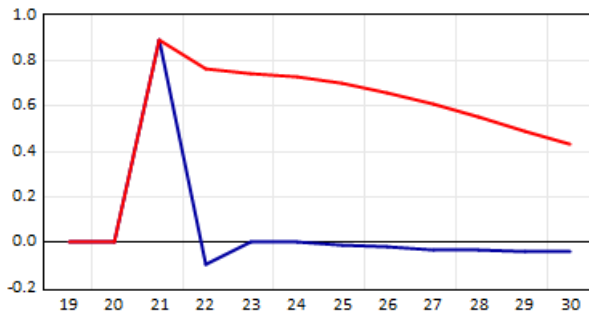
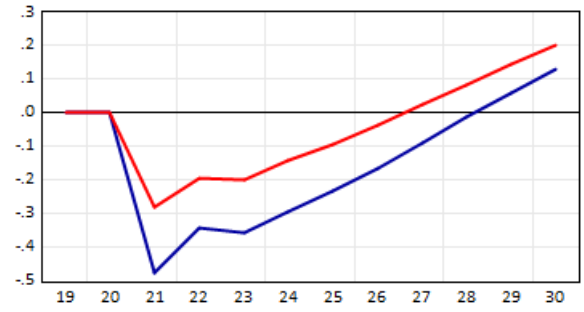
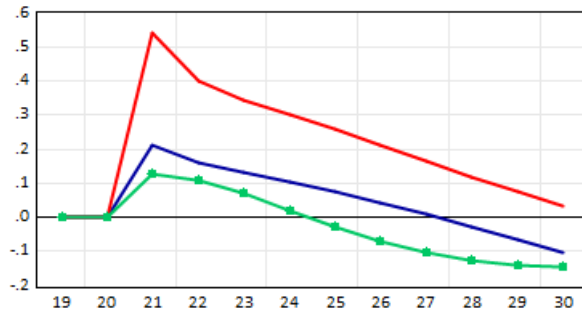
Bottom right → 5% of GDP increase in helicopter money (pure v CB transfer to the government v 5% of GDP increase in public investment v social benefits)

GDP volume, $\frac{Y_{shock}}{Y_{baseline}} \times 100$

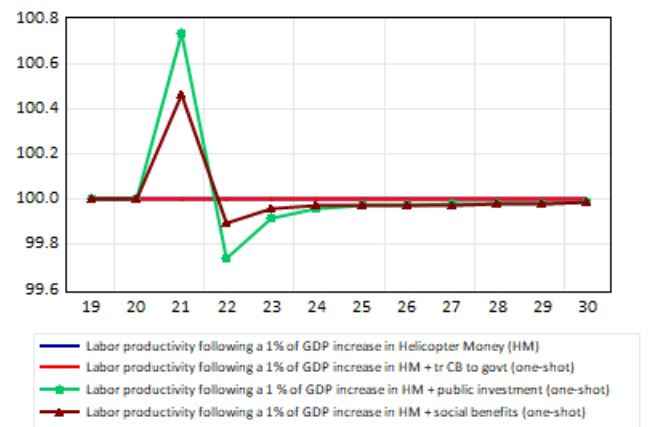
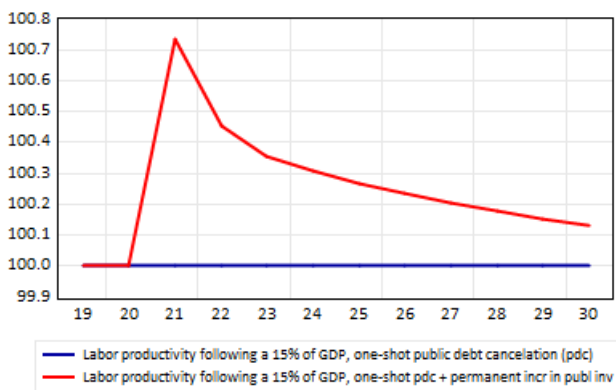
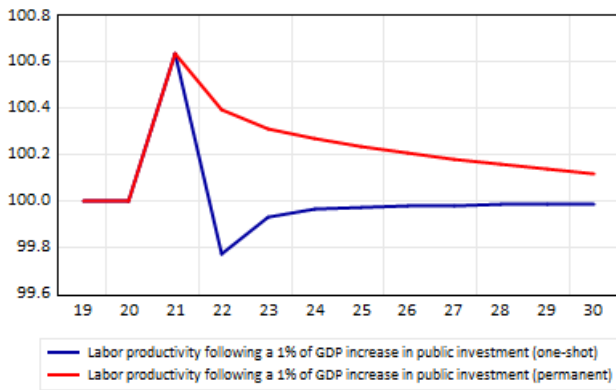
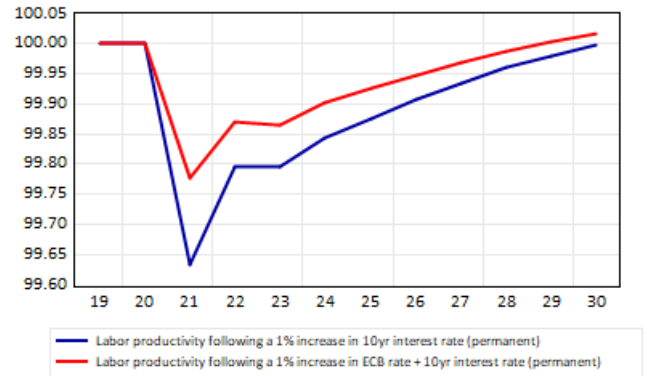
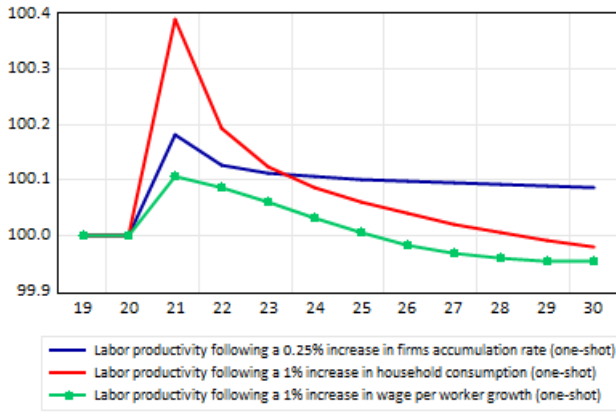


$$\text{GDP deflator, } \frac{p_{Y_{\text{shock}}}}{p_{Y_{\text{baseline}}}} \times 100$$

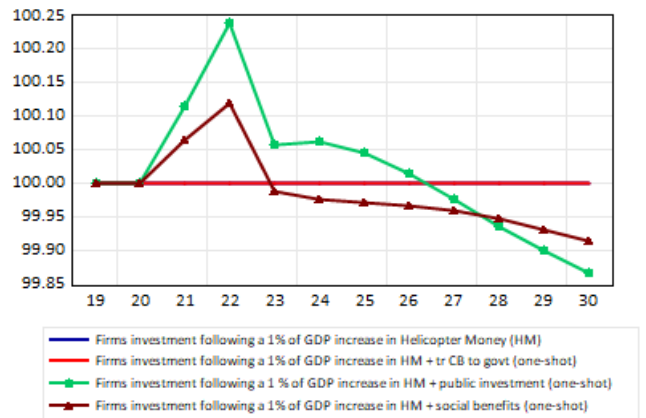
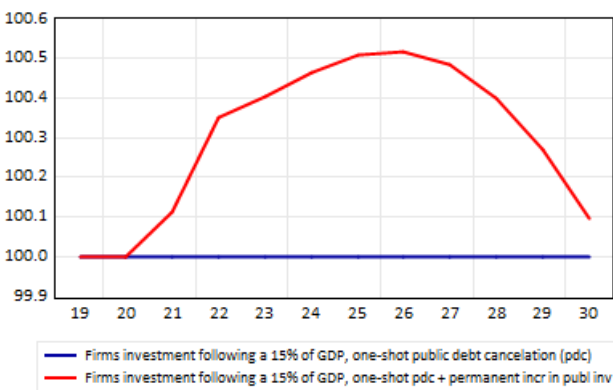
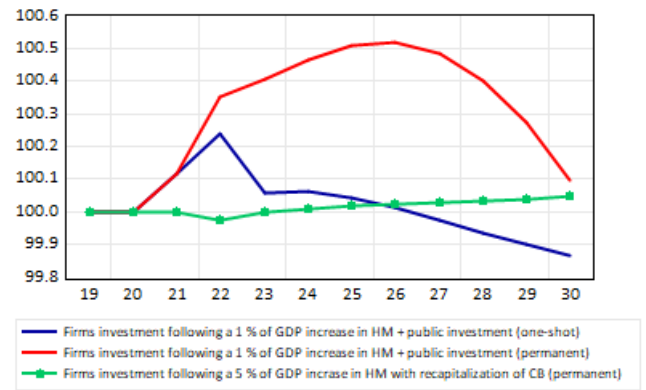
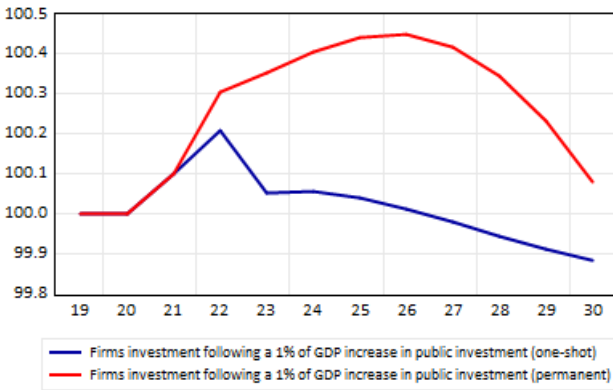
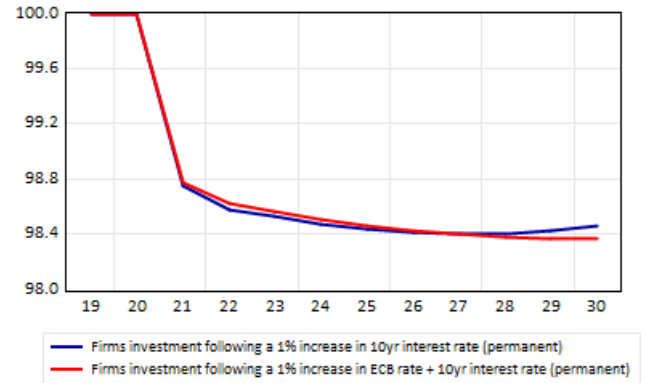
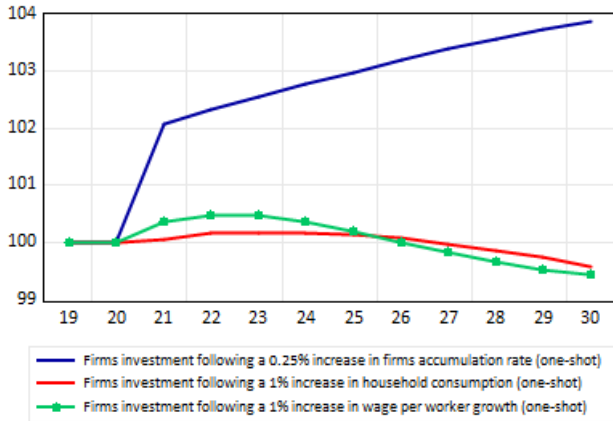


Output gap, $GAP_{shock} - GAP_{baseline}$ (%)

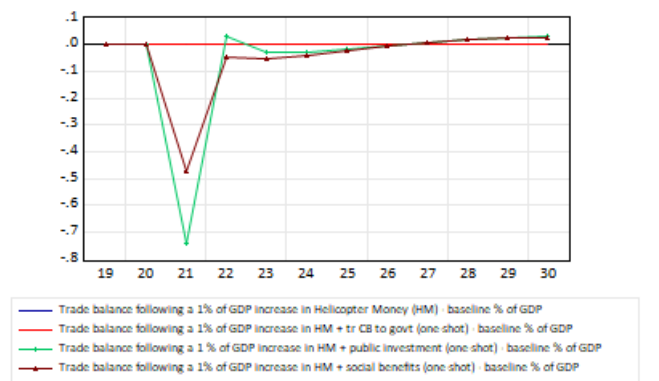
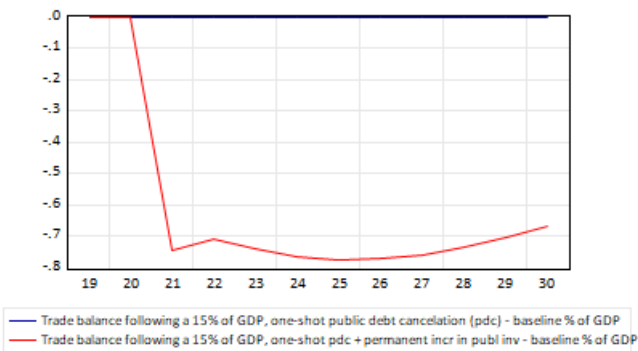
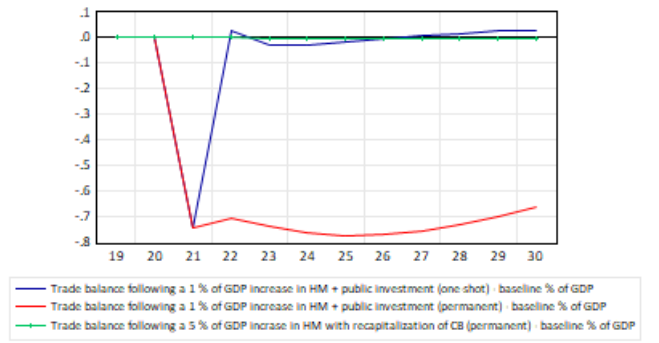
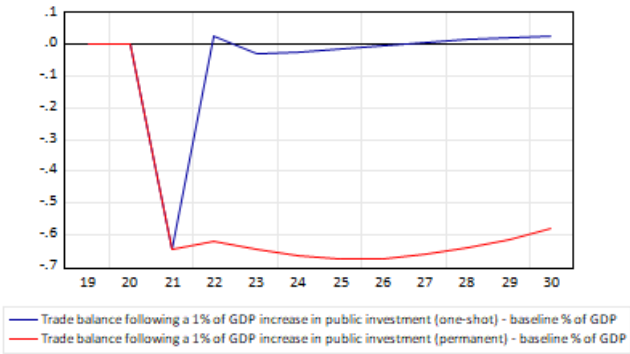
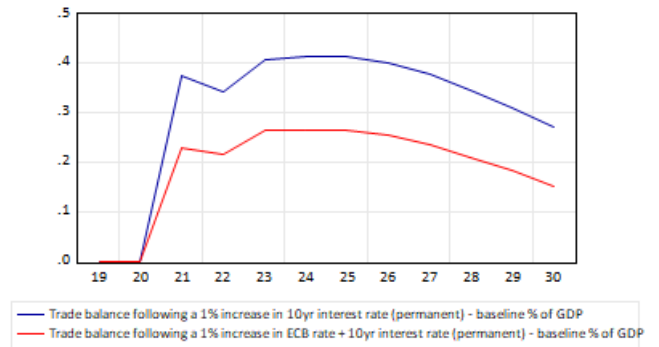
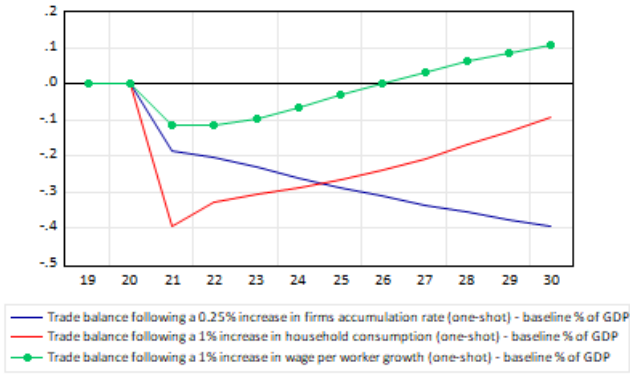
$$\text{Labor productivity} \left(\frac{va_{shock}^M}{N_{shock}^M} \times 100 / \frac{va_{baseline}^M}{N_{baseline}^M} \right)$$



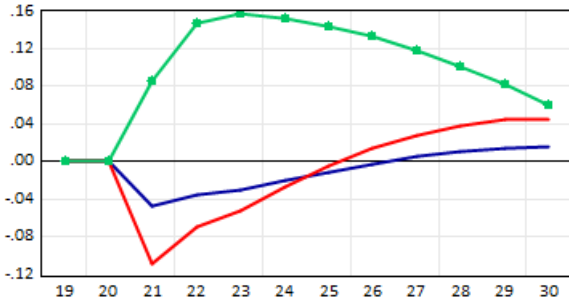
Firms' investment volume, $\frac{I_{shock}^F}{I_{baseline}^F} (\times 100)$



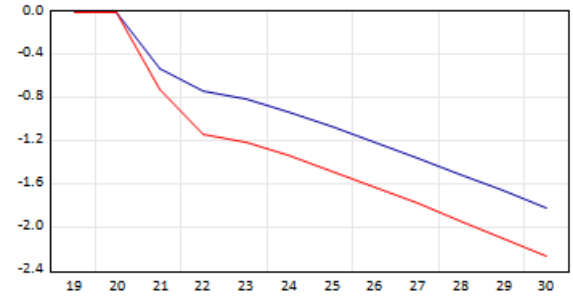
$$\text{Trade balance, } \left(\frac{p_{X_{shock}} X_{shock} - p_{IM_{shock}} IM_{shock}}{p_{Y_{shock}} Y_{shock}} - \frac{p_{X_{baseline}} X_{baseline} - p_{IM_{baseline}} IM_{baseline}}{p_{Y_{baseline}} Y_{baseline}} \right) (\%)$$



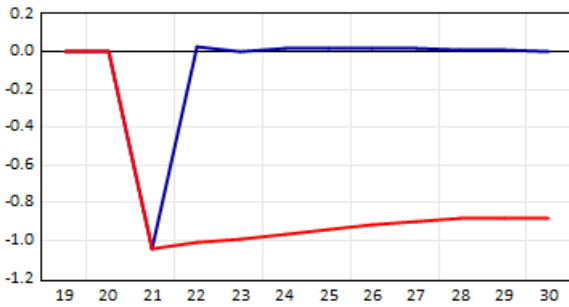
$$\text{Government balance, } \left(\frac{FCN_{shock}^G}{p_{Y_{shock}} Y_{shock}} - \frac{FCN_{baseline}^G}{p_{Y_{baseline}} Y_{baseline}} \right) (\%)$$



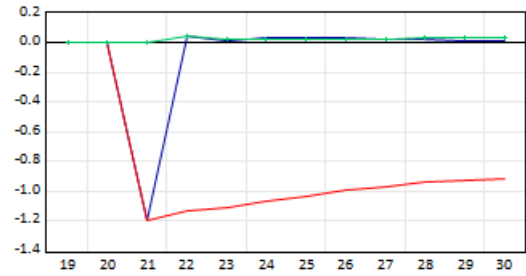
— Government balance-GDP, 0.25% increase in firms accumulation rate (one-shot) - baseline (%)
 — Government balance-GDP, 1% increase in household consumption (one-shot) - baseline (%)
 — Government balance-GDP, 1% increase in wage per worker growth (one-shot) - baseline (%)



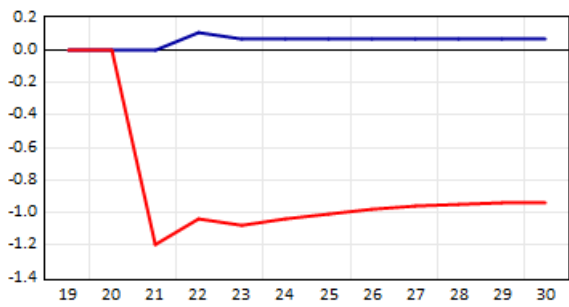
— Government balance-GDP, 1% increase in 10yr interest rate (permanent) - baseline (%)
 — Government balance-GDP, 1% increase in ECB rate + 10yr interest rate (permanent) - baseline (%)



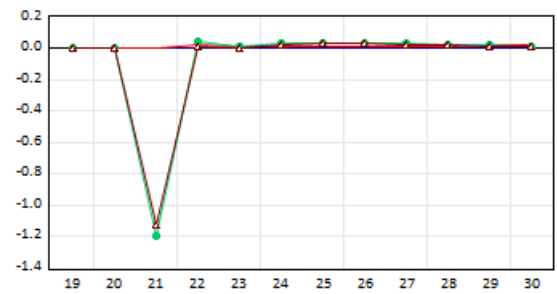
— Government balance-GDP, 1% of GDP increase in public investment (one-shot) - baseline (%)
 — Government balance-GDP, 1% of GDP increase in public investment (permanent) - baseline (%)



— Government balance-GDP, 1% of GDP increase in HM + public investment (one shot) - baseline (%)
 — Government balance-GDP, 1% of GDP increase in HM + public investment (permanent) - baseline (%)
 — Government balance-GDP, 5% of GDP increase in HM with recapitalization of CB (permanent) - baseline (%)

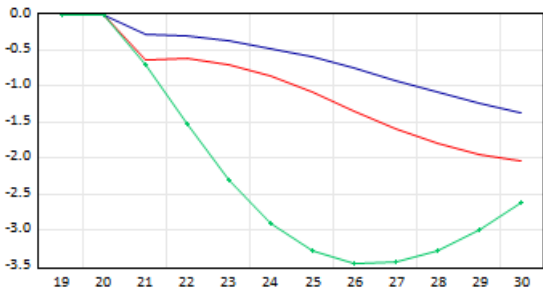


— Government balance-GDP, 15% of GDP, one-shot public debt cancellation (pdc) - baseline (%)
 — Government balance-GDP, 15% of GDP, one-shot pdc + permanent incr in publ inv - baseline (%)

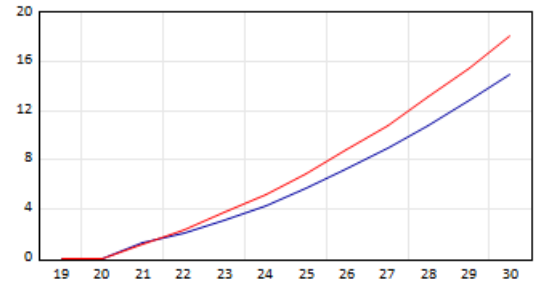


— Government balance-GDP, 1% of GDP increase in Helicopter Money (HM) - baseline (%)
 — Government balance-GDP, 1% of GDP increase in HM + tr CB to govt (one-shot) - baseline (%)
 — Government balance-GDP, 1% of GDP increase in HM + public investment (one-shot) - baseline (%)
 — Government balance-GDP, 1% of GDP increase in HM + social benefits (one-shot) - baseline (%)

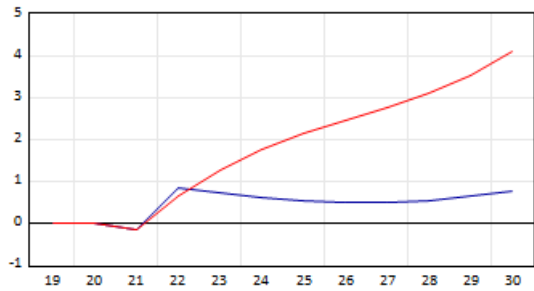
$$\text{Government debt, } \left(\frac{p_{B_L}^G \text{ shock } B_L^G}{p_{Y \text{ shock}} Y^G} - \frac{p_{B_L}^G \text{ baseline } B_L^G}{p_{Y \text{ baseline}} Y^G} \right) (\%)$$



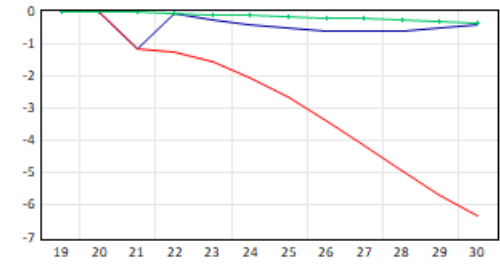
— Government debt-GDP, scenario 0.25% increase in firms accumulation rate (one-shot) - baseline (%)
 — Government debt-GDP, scenario 1% increase in household consumption (one-shot) - baseline (%)
 — Government debt-GDP, scenario 1% increase in wage per worker growth (one-shot) - baseline (%)



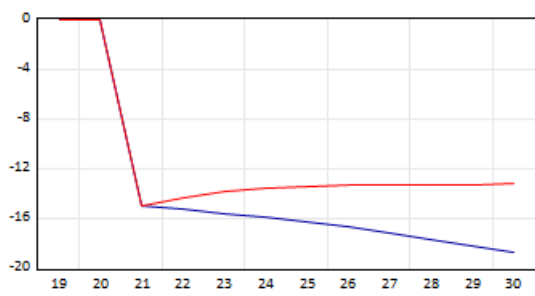
— Government debt GDP, scenario 1% increase in 10yr interest rate (permanent) - baseline (%)
 — Government debt GDP, scenario 1% increase in ECB rate + 10yr interest rate (permanent) - baseline (%)



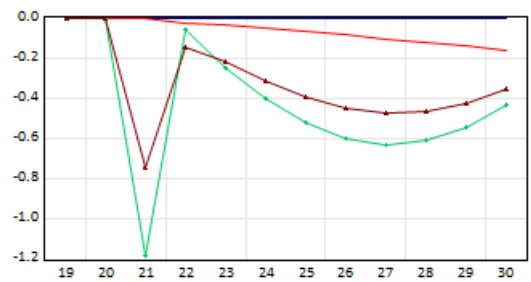
— Government debt-GDP, scenario 1% of GDP increase in public investment (one-shot) - baseline (%)
 — Government debt-GDP, scenario 1% of GDP increase in public investment (permanent) - baseline (%)



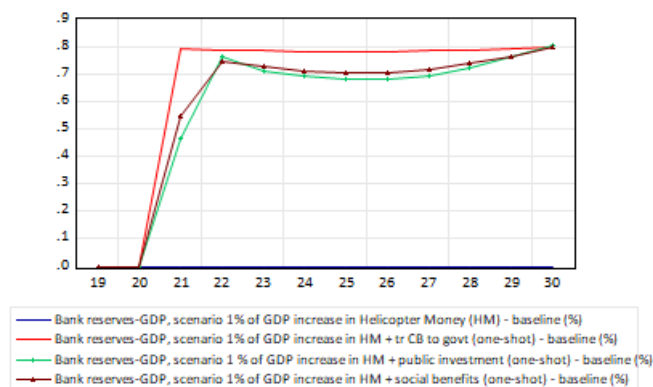
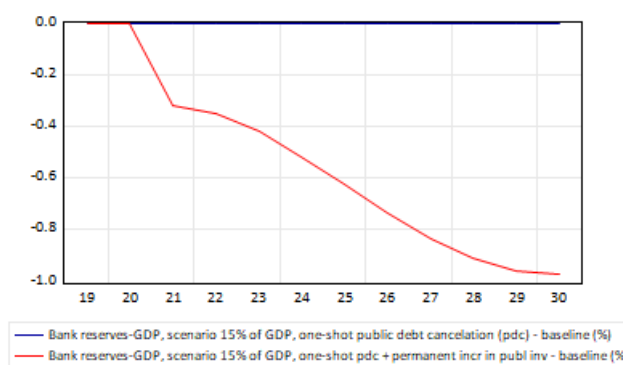
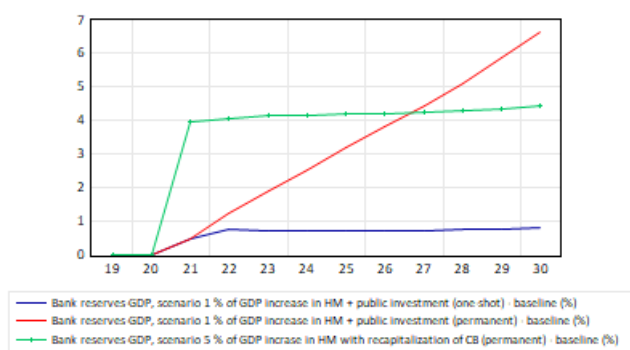
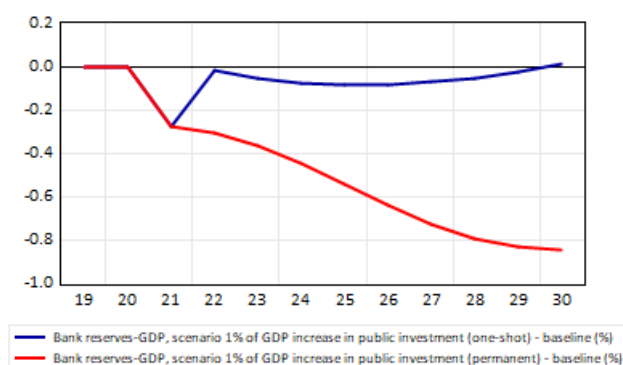
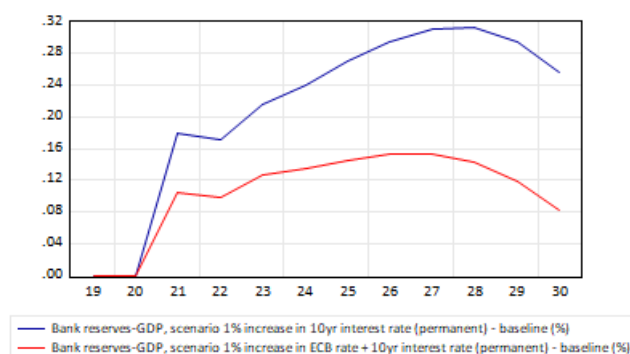
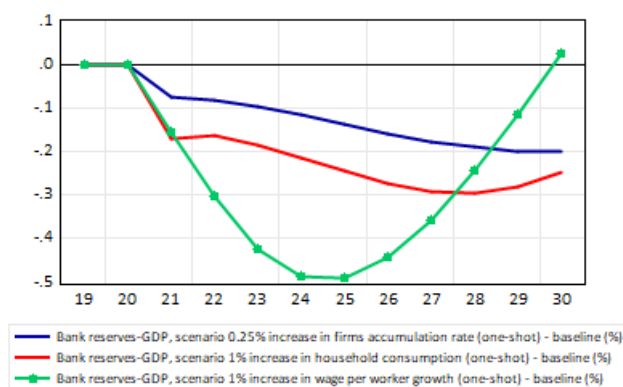
— Government debt GDP, scenario 1% of GDP increase in HM + public investment (one shot) - baseline (%)
 — Government debt GDP, scenario 1% of GDP increase in HM + public investment (permanent) - baseline (%)
 — Government debt GDP, scenario 5% of GDP increase in HM with recapitalization of CB (permanent) - baseline (%)



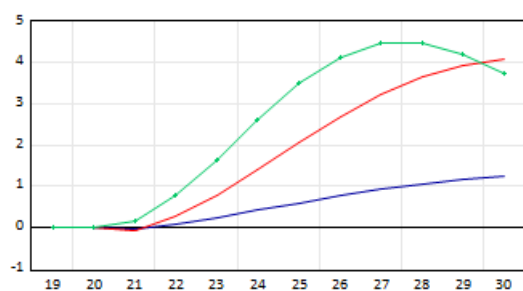
— Government debt-GDP, scenario 15% of GDP, one-shot public debt cancellation (pdc) - baseline (%)
 — Government debt-GDP, scenario 15% of GDP, one-shot pdc + permanent incr in publ inv - baseline (%)



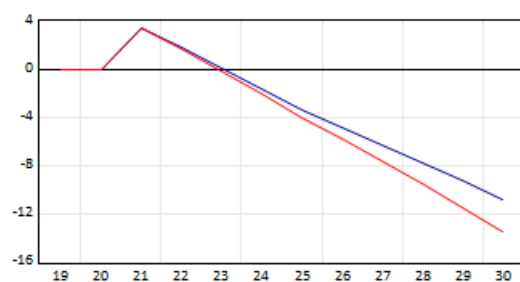
— Government debt GDP, scenario 1% of GDP increase in Helicopter Money (HM) - baseline (%)
 — Government debt GDP, scenario 1% of GDP increase in HM + tr CB to govt (one shot) - baseline (%)
 — Government debt GDP, scenario 1% of GDP increase in HM + public investment (one shot) - baseline (%)
 — Government debt GDP, scenario 1% of GDP increase in HM + social benefits (one shot) - baseline (%)

Bank reserves RES 

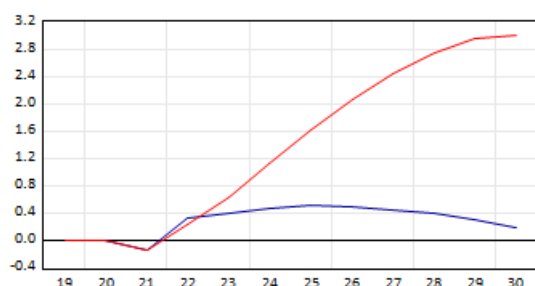
Government wealth (%)



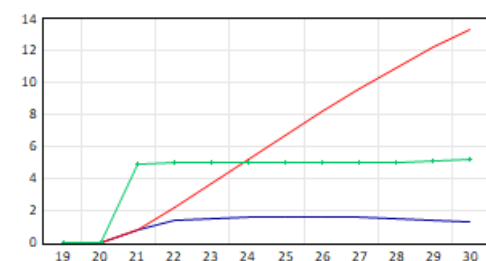
— Government wealth-GDP, scenario 0.25% increase in firms accumulation rate (one-shot) - baseline (%)
 — Government wealth-GDP, scenario 1% increase in household consumption (one-shot) - baseline (%)
 — Government wealth-GDP, scenario 1% increase in wage per worker growth (one-shot) - baseline (%)



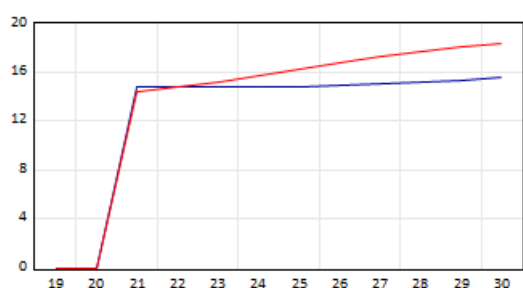
— Government wealth GDP, scenario 1% increase in 10yr interest rate (permanent) - baseline (%)
 — Government wealth GDP, scenario 1% increase in ECB rate + 10yr interest rate (permanent) - baseline (%)



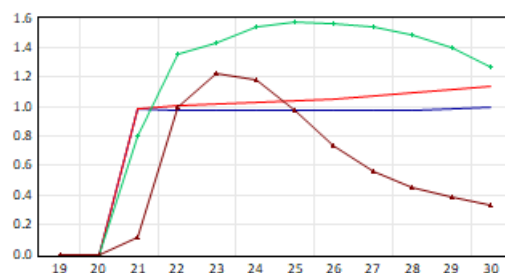
— Government wealth-GDP, scenario 1% of GDP increase in public investment (one-shot) - baseline (%)
 — Government wealth-GDP, scenario 1% of GDP increase in public investment (permanent) - baseline (%)



— Government wealth GDP, scenario 1% of GDP increase in HM + public investment (one-shot) - baseline (%)
 — Government wealth GDP, scenario 1% of GDP increase in HM + public investment (permanent) - baseline (%)
 — Government wealth GDP, scenario 5% of GDP increase in HM with recapitalization of CB (permanent) - baseline (%)



— Government wealth GDP, scenario 15% of GDP, one shot public debt cancellation (pdc) - baseline (%)
 — Government wealth GDP, scenario 15% of GDP, one shot pdc + permanent incr in publ inv - baseline (%)



— Government wealth GDP, scenario 1% of GDP increase in Helicopter Money (HM) - baseline (%)
 — Government wealth GDP, scenario 1% of GDP increase in HM + tr CB to govt (one-shot) - baseline (%)
 — Government wealth GDP, scenario 1% of GDP increase in HM + public investment (one-shot) - baseline (%)
 — Government wealth GDP, scenario 1% of GDP increase in HM + social benefits (one-shot) - baseline (%)

Central bank wealth (%)

