



Introduction to Stock-Flow Consistent Macroeconomic Modeling

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Github

All assignments, announcements or any other materials related to the course will be posted on the page of the course in Github:

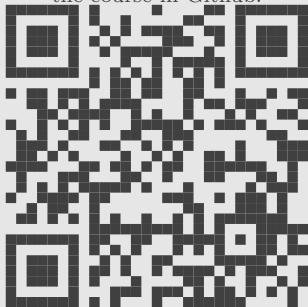




Table of Contents

1 History

- ▶ History
- ▶ SFC
- ▶ Godley & Lavoie
- ▶ Onomastic & Data Structures



What is SFC?

1 History

Godley, Wynne, and Marc Lavoie. 2012. Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth. 2nd ed. 2012 edition. New York: Palgrave Macmillan.



What is SFC?

1 History

Most monetary economists agree that the financial system is a complex of interrelated markets for assets and debts. The prices and interest rates determined in these markets and the quantities to which they refer both influence and are influenced by the "real economy," the complex of markets for currently produced goods and services. These interdependencies are easy to acknowledge in principle but difficult to honor in practice, either in theoretical analysis or in empirical investigation. All of us seek and use simplifications to overcome the frustrating sterility of the cliché that everything depends on everything else. But we all know that we do so at some peril. (Brainard and Tobin 1968).



Early protagonists

1 History



Early protagonists

1 History



Early protagonists

1 History

- Wynne Godley (HM Treasury, Cambridge, Levy Institute)



Early protagonists

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- Wynne Godley (HM Treasury, Cambridge, Levy Institute)
- James Tobin (Yale)



Early protagonists

1 History

- Wynne Godley (HM Treasury, Cambridge, Levy Institute)
- James Tobin (Yale)
- Significant contributions by Paul Davidson, Alfred Eichner, Lance Taylor, Peter Skott, and Duncan Foley



History

1 History



History

1 History



History

1 History

- We can distinguish two periods:



History

1 History

- We can distinguish two periods:
- 1960s-2007 (Hard Times for Keynesian Theorising)



History

1 History

- We can distinguish two periods:
- 1960s-2007 (Hard Times for Keynesian Theorising)
- 2007-present





- **Macroeconomic Accounting Literature:** Clark (1937), Kuznets (1941) and Copeland (1949, 1958), but also in England with Stone (1961, 1964, 1965, 1968, 1970, 1984), Stone and Brown (1962). These views were unified under the international accounting principles promoted by the United Nations National System (1953, 1968, 1993, 2008)
- **Portfolio Literature:** Metzler (1951) and Markowitz (1952, 1959) and Sharpe (1963); Tobin (1958, 1969, 1982), Brainard and Tobin (1969) and Backus et al (1980); Tobin and De Macedo (1980), De Macedo (1983), Owen (1986)



- Macroeconomic Accounting Literature: Clark (1937), Kuznets (1941) and Copeland (1949, 1958), but also in England with Stone (1961, 1964, 1965, 1968, 1970, 1984), Stone and Brown (1962). These views were unified under the international accounting principles promoted by the United Nations National System (1953, 1968, 1993, 2008)
- Portfolio Literature: Metzler (1951) and Markowitz (1952, 1959) and Sharpe (1963); Tobin (1958, 1969, 1982), Brainard and Tobin (1969) and Backus et al (1980); Tobin and De Macedo (1980), De Macedo (1983), Owen (1986)



History

1 History

1. First generation of SFC: Cambridge Economic Policy Group models (1976: 1977), Tobin and De Macedo (1980), Godley and Cripps (1983), Godley (1996: 1999), Godley and Lavoie (2003: 2007);
2. Multi-country models: Lequain (2003), Lavoie and Zhao (2010), Mazier and Aliti (2012), Valdecantos and Zezza (2015), GPM model (Cripps and Izurieta, 2014);
3. Models on open economies: Valdecantos (2011; 2014), Bortz (2014), Bonizzi (2015), Pedrosa and Biancarelli (2015), Raza et al (2019).



History

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Table of Contents

2 SFC

► History

► SFC

► Godley & Lavoie

► Onomastic & Data Structures



General principles of SFC models

2 SFC

General principles of SFC models

2 SFC

- **Flow-Consistency:** Everything comes from somewhere and goes somewhere; there are no "black holes."

Horizontal (Flow) Consistency: The income for somebody is a payment from somebody else. [▶ see](#)

e.g the income of a household is the payment for a firm, the deficit of a sector is the surplus of another sector, the exports of a country are the imports of another country.



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

- **Flow-Consistency:** Everything comes from somewhere and goes somewhere; there are no "black holes."

Vertical (Flow) Consistency: Every transaction involves at least two entries within each unit, usually referred to as credit and debit. [▶ see](#)

e.g. when a household receives income, its deposits are credited by the same amount.



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

- **Stock-Consistency:** The financial liabilities of someone are the financial assets of someone else [▶ see](#)

e.g. a loan is a liability for a household and an asset for a bank, a Treasury bond is a liability for the government and an asset for its holder.



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

- **Stock-Flow-Consistency:** Every flow implies the change in one or more stocks. Positive net saving implies an increase in net wealth and vice versa [▶ see](#)

e.g. when the net saving of a household is positive one or more of its assets (deposits, equities, bonds etc.) increase and its net wealth also increases.



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

- **Quadruple-entry bookkeeping:** Every transaction involves a quadruple entry in accounting. [▶ see](#)

e.g. What happens when a household purchases a product from a firm?
The accounting registers an increase in the revenues of the firm and the expenditure of the household and at the same time a decrease in at least one asset (or increase in a liability) of the household and correspondingly an increase in at least one asset of the firm.



General principles of SFC models

2 SFC



General principles of SFC models

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General principles of SFC models

2 SFC

- **Stocks feed back on flows**

e.g. higher debt means increase in the interest payments in the future, higher wealth allows the increase in the expenditure in the future



General principles of SFC models

2 SFC

- **Stocks feed back on flows**
e.g. higher debt means increase in the interest payments in the future, higher wealth allows the increase in the expenditure in the future
- As a result **The models are dynamic**
e.g. The position of the system at every time period is determined by its historical path



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

- In theoretical SFC models the long-run equilibrium is defined as the state where the **Stock-Flow ratios are stable**. The system converges towards that equilibrium.



General principles of SFC models

2 SFC

- In theoretical SFC models the long-run equilibrium is defined as the state where the **Stock-Flow ratios are stable**. The system converges towards that equilibrium.
- At a practical level this is important because a situation that is characterized by a constant increase (or decrease) of a Stock-Flow ratio is unsustainable.



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

General principles of SFC models

2 SFC

- As opposed to neoclassical economics **there is a central role for money and the financial sector**

(the prices and interest rates determined in these [financial] markets and the quantities to which they refer both influence and are influenced by the ‘real economy’ [...]. These interdependences are easy to acknowledge in principle but difficult to honor in practice, either in theoretical analysis or in empirical investigation)



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC



General principles of SFC models

2 SFC

- The accounting structure of the models is based on the **System of National Accounts** and the **Financial Accounts**



Table of Contents

3 Godley & Lavoie

► History

► SFC

► Godley & Lavoie

► Onomastic & Data Structures



General principles of SFC models

3 Godley & Lavoie



General principles of SFC models

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General principles of SFC models

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- How is output decomposed in the National Accounts?



General principles of SFC models

3 Godley & Lavoie

- How is output decomposed in the National Accounts?
- Two approaches: Expenditure & Income

$$C + I + G + X - M = GDP = WB + F$$



Standard textbook simplified national income matrix

3 Godley & Lavoie

	Households	Business		Government	Σ
		Current	Capital		
Consumption	$-C$	$+C$			0
Govt. expenditure		$+G$		$-G$	0
Investment		$+I$	$-I$		0
$[GDP(memo)]$		$[Y]$			
Wages	$+WB$	$-WB$			0
Profits	$+F$	$-F$			0
Tax net of transfers	$-T$			$+T$	0
Σ	$SAVING$	0	$INVESTMENT(-)$	$GOVTSURPLUS$	



Standard textbook simplified national income matrix

3 Godley & Lavoie

		Business			
	Households	Current	Capital	Government	Σ
Consumption	$-C$	$+C$			0
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Σ	<i>SAVING</i>	0	<i>INVESTMENT(-)</i>	<i>GOVT SURPLUS</i>	

Standard textbook simplified national income matrix

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Tax net of transfers	$-T$			$+T$	0
Σ	<i>SAVING</i>	0	<i>INVESTMENT(-)</i>	<i>GOVT SURPLUS</i>	

- Sources of Funds (+), Uses of funds (-), Each variable is a transaction between two sectors
- Current Account (transactions related to production and distribution of income)
- Capital account (transactions related to accumulation of assets)



Income and cash flow statement of a unit

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<i>Sources</i>	<i>Uses</i>
(+)	(−)



Income and cash flow statement of a unit

3 Godley & Lavoie

	<i>Sources</i>	<i>Uses</i>
	(+)	(-)
Current Account	1) Revenues	
		2) Expenses
	3) <i>Increase in Net wealth</i> = 1) - 2)	



◀ ◻ ▶ ◀ ◻ ▶ ◀ ≡ ▶ ◀ ≡ ▶ ≡



Standard textbook simplified national income matrix

3 Godley & Lavoie

	Households	Business		Government	Σ
		Current	Capital		
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Govt. expenditure		$+G$		$-G$	0
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Wages	$+WB$	$-WB$			0
Profits	$+F$	$-F$			0
Tax net of transfers	$-T$			$+T$	0
Σ	<i>SAVING</i>	0	<i>INVESTMENT(-)</i>	<i>GOVTSURPLUS</i>	

- What is wrong with this matrix?
- Why is this matrix incomplete?



General principles of SFC models

3 Godley & Lavoie



General principles of SFC models

3 Godley & Lavoie



General principles of SFC models

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- **Flow-Consistency:** Everything comes from somewhere and goes somewhere; there are no "black holes."



General principles of SFC models

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- **Flow-Consistency:** Everything comes from somewhere and goes somewhere; there are no "black holes."
- **Stock-Flow-Consistency:** Every flow implies the change in one or more stocks. Positive net saving implies an increase in net wealth and vice versa.

Transactions flow matrix

3 Godley & Lavoie

	Households (1)	Production Firm		Banks (4)	Government (5)	Σ
		Current (2)	Capital (3)			
Consumption	$-C$	$+C$				0
Govt. expenditure		$+G$			$-G$	0
Investment		$+I$	$-I$			0
Wages	$+WB$	$-WB$				0
Profits	$+FD_f$	$-F_f$	$+FU_f$			0
Tax net of transfers	$-T$				$+T$	0
Change in loans			$+\Delta L_f$	$-\Delta L$		0
Change in cash	$-\Delta H_h$			$-\Delta H_b$	$+\Delta H$	0
Change in deposits	$-\Delta M$			$+\Delta M$		0
Change in bills	$-\Delta B_h$			$-\Delta B_{hb}$	$+\Delta B$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$			0
Σ	0	0	0	0	0	0

Transactions flow matrix

3 Godley & Lavoie

		Production Firm				
	Households (1)	Current (2)	Capital (3)	Banks (4)	Government (5)	Σ
Consumption	$-C$	$+C$				0
Govt. expenditure		$+G$			$-G$	0
Investment		$+I$	$-I$			0
Wages	$+WB$	$-WB$				0
Profits	$+FD_f$	$-F_f$	$+FU_f$			0
Tax net of transfers	$-T$				$+T$	0
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Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$			0
Σ	0	0	0	0	0	0

- Banking sector is indispensable-Matrix is not complete without it

Transactions flow matrix

3 Godley & Lavoie

	Households (1)	Production Firm		Banks (4)	Government (5)	Σ
		Current (2)	Capital (3)			
Consumption	$-C$	$+C$				0
Govt. expenditure		$+G$			$-G$	0
Investment		$+I$	$-I$			0
Wages	$+WB$	$-WB$				0
Profits	$+FD_f$	$-F_f$	$+FU_f$			0
Tax net of transfers	$-T$				$+T$	0
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Change in bills	$-\Delta B_h$			$-\Delta B_{hb}$	$+\Delta B$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$			0
Σ	0	0	0	0	0	0



Transactions flow matrix

3 Godley & Lavoie



Transactions flow matrix

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- Complete-General Equilibrium System



Transactions flow matrix

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- Complete-General Equilibrium System
- Everything comes from somewhere and goes somewhere



Transactions flow matrix

3 Godley & Lavoie

- Complete-General Equilibrium System
- Everything comes from somewhere and goes somewhere
- Rows and columns of the Matrix sum to 0



Transactions flow matrix

3 Godley & Lavoie

- Complete-General Equilibrium System
- Everything comes from somewhere and goes somewhere
- Rows and columns of the Matrix sum to 0
- Balance Sheets?



	Households	Production firms	Banks	Government (5)	Σ
Loans	$-L$	$-L$	$+L$		0
Cash	$+H_h$		$+H_b$	$-H$	0
Deposits	$+M$		$-M$		0
Bills	$+B_h$		$+B_b$	$-B$	0
Equities	$+e * p_e$	$-e_f * p_e$	$-e_b * p_e$		0
Tangibile capital	$+K_h$	$+K_f$			$+K$
Sum (net worth)	NW_h	NW_f	NW_b	NW_g	0



Assumptions

3 Godley & Lavoie

- Everything comes from somewhere and goes somewhere—Rows and columns of the Matrix sum to 0—Complete/General Equilibrium System
- This completeness means that once $n - 1$ equations are satisfied then the n^{th} equation will be found to be satisfied as well
- Walras' law: the values of excess demands must sum to zero



Closure

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- Closure: direction of macroeconomic causality
- Even if the accounting structure of the model is the same we get very different results if we "close" it differently
- Usually the SFC models "close" from the demand side



Central Bank

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	Households	Production firms	Banks	Government	Central bank	Σ
Loans	$-L_h$	$-L_f$	$+L$			0
Cash	$+H_h$		$+H_b$		$-H$	0
Deposits	$+M$		$-M$			0
Bills	$+B_h$		$+B_b$	$-B$	$+B_{cb}$	0
Equities	$+e * p_e$	$-e_f * p_e$	$-e_b * p_e$			0
Tangibile capital	$+K_h$	$+K_f$				$+K$
Sum (net worth)	NW_h	NW_f	NW_b	NW_g	0	$-K$
Σ	0	0	0	0	0	0



Gross domestic product



Gross domestic product

Plus: Income receipts from the rest of the world

Less: Income payments to the rest of the world



Gross domestic product

Plus: Income receipts from the rest of the world

Less: Income payments to the rest of the world

Equals: Gross national product



Gross domestic product

Plus: Income receipts from the rest of the world

Less: Income payments to the rest of the world

Equals: Gross national product

Less: Consumption of fixed capital



Gross domestic product

Plus: Income receipts from the rest of the world

Less: Income payments to the rest of the world

Equals: Gross national product

Less: Consumption of fixed capital

Equals: Net national product



Plus: Income receipts from the rest of the world

Less: Income payments to the rest of the world

Equals: Gross national product

Less: Consumption of fixed capital

Equals: Net national product

Equals: National income

Wages

Profits

Interest Payments

Indirect Taxes



So, in a closed economy without depreciation



So, in a closed economy without depreciation

$$C + I + G = GDP = WB + F + INT + T$$

Conventional income and expenditure matrix

3 Godley & Lavoie

	Households (1)	Business		Government (5)	Σ
		Current	Capital		
Consumption	$-C$	$+C$			0
Govt. expenditure		$+G$		$-G$	0
Investment		$+I_f$	$-I_f$		0
Wages	$+WB$	$-WB$			0
Profits	$+FD$	$-F$	$+FU$		0
Tax net of transfers	$-T_h$	$-T_f$		$+T$	0
Interest payments	$+INT_h$	$-INT_f$		$-INT_h_g$	0
Σ	SAV_h	0	$FU - I_f$	$-DEF$	0

$$SAV_h + FU - I_f - DEF = 0$$

Conventional income and expenditure matrix

3 Godley & Lavoie

	Households (1)	Business		Government (5)	Σ
		Current	Capital		
Consumption	$-C$	$+C$			0
Govt. expenditure		$+G$		$-G$	0
Investment		$+I_f$	$-I_f$		0
Wages	$+WB$	$-WB$			0
Profits	$+FD$	$-F$	$+FU$		0
Tax net of transfers	$-T_h$	$-T_f$		$+T$	0
Interest payments	$+INT_h$	$-INT_f$		$-INT_h_g$	0
Σ	SAV_h	0	$FU - I_f$	$-DEF$	0

$$SAV_h + FU - I_f - DEF = 0$$

$$S = I$$

	Wages	Profits	Production	Government	Cap. Acc.	Sum
Wages			WB			Y_w
Profits			F	INT		Y_f
Production	C_w	C_f		G	I	Y_p
Government	T_w	T_f	T_p			Y_g
Cap. Acc.	S_w	S_f		$-GDEF$	$-I$	0
Σ	Y_w	Y_f	Y_p	Y_g	0	

Transactions flow matrix

3 Godley & Lavoie

	Households (1)	Production Firm		Banks		central Bank			Σ
		Current (2)	Capital (3)	Current (4)	Capital (5)	Government (6)	Current (7)	Capital (8)	
Consumption	$-C$	$+C$							0
Govt. expenditure		$+G$				$-G$			0
Investment		$+I$	$-I$						0
Wages	$+WB$	$-WB$							0
Profits, firms	$+FD_f$	$-F_f$	$+FU_f$						0
Profits, banks	$+FD_b$			$-F_b$	$+FU_f$				0
Profits, CB						$+F_{cb}$	$-F_{cb}$		0
Loan interest	$-r_{l(-1)} * L_{h(-1)}$	$-r_{l(-1)} * L_{f(-1)}$		$+r_{l(-1)} * L_{(-1)}$					0
Deposit interest	$+r_{m(-1)} * M_{h(-1)}$			$-r_{m(-1)} * M_{(-1)}$					0
Bill interest	$+r_{b(-1)} * B_{h(-1)}$			$+r_{b(-1)} * B_{b(-1)}$		$-r_{b(-1)} * B_{(-1)}$	$+r_{b(-1)} * B_{cb(-1)}$		0
Tax net of transfers	$-T_h$	$-T_f$		$-T_b$		$+T$			0
Change in loans	$+\Delta L_f$		$+\Delta L_f$		$-\Delta L$				0
Change in cash	$-\Delta H_h$				$-\Delta H_b$			$+\Delta H$	0
Change in deposits	$-\Delta M$				$+\Delta M$				0
Change in bills	$-\Delta B_h$				$-\Delta B_{hb}$	$+\Delta B$		$-\Delta B_{cb}$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$		$+\Delta e * p_e$				0
Σ	0	0	0	0	0	0		0	0

Horizontal (Flow) Consistency

3 Godley & Lavoie

		Production Firm		Banks			central Bank		
	Households (1)	Current (2)	Capital (3)	Current (4)	Capital (5)	Government (6)	Current (7)	Capital (8)	Σ
Consumption	$-C$	$+C$							0
Govt. expenditure		$+G$				$-G$			0
Investment		$+I$	$-I$						0
Wages	$+WB$	$-WB$							0
Profits, firms	$+FD_f$	$-F_f$	$+FU_f$						0
Profits, banks	$+FD_b$			$-F_b$	$+FU_f$				0
Profits, CB						$+F_{cb}$	$-F_{cb}$		0
Loan interest	$-r_{l(-1)} * L_{h(-1)}$	$-r_{l(-1)} * L_{f(-1)}$		$+r_{l(-1)} * L_{(-1)}$					0
Deposit interest	$+r_{m(-1)} * M_{h(-1)}$			$-r_{m(-1)} * M_{(-1)}$					0
Bill interest	$+r_{b(-1)} * B_{h(-1)}$			$+r_{b(-1)} * B_{b(-1)}$		$-r_{b(-1)} * B_{(-1)}$	$+r_{b(-1)} * B_{cb(-1)}$		0
Tax net of transfers	$-T_h$	$-T_f$		$-T_b$		$+T$			0
Change in loans	$+\Delta L_f$		$+\Delta L_f$		$-\Delta L$				0
Change in cash	$-\Delta H_h$				$-\Delta H_b$			$+\Delta H$	0
Change in deposits	$-\Delta M$				$+\Delta M$				0
Change in bills	$-\Delta B_h$				$-\Delta B_{hb}$	$+\Delta B$		$-\Delta B_{cb}$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$		$+\Delta e * p_e$				0
Σ	0	0	0	0	0	0		0	0

Vertical (Flow) Consistency

3 Godley & Lavoie

	Households (1)	Production Firm		Banks		Government (6)	central Bank		Σ
		Current (2)	Capital (3)	Current (4)	Capital (5)		Current (7)	Capital (8)	
Consumption	$-C$	$+C$							0
Govt. expenditure		$+G$				$-G$			0
Investment		$+I$	$-I$						0
Wages	$+WB$	$-WB$							0
Profits, firms	$+FD_f$	$-F_f$	$+FU_f$						0
Profits, banks	$+FD_b$			$-F_b$	$+FU_f$				0
Profits, CB						$+F_{cb}$	$-F_{cb}$		0
Loan interest	$-r_{l(-1)} * L_{h(-1)}$	$-r_{l(-1)} * L_{f(-1)}$		$+r_{l(-1)} * L_{(-1)}$					0
Deposit interest	$+r_{m(-1)} * M_{h(-1)}$			$-r_{m(-1)} * M_{(-1)}$					0
Bill interest	$+r_{b(-1)} * B_{h(-1)}$			$+r_{b(-1)} * B_{b(-1)}$		$-r_{b(-1)} * B_{(-1)}$	$+r_{b(-1)} * B_{cb(-1)}$		0
Tax net of transfers	$-T_h$	$-T_f$		$-T_b$		$+T$			0
Change in loans	$+\Delta L_f$		$+\Delta L_f$		$-\Delta L$				0
Change in cash	$-\Delta H_h$				$-\Delta H_b$			$+\Delta H$	0
Change in deposits	$-\Delta M$				$+\Delta M$				0
Change in bills	$-\Delta B_h$				$-\Delta B_{hb}$	$+\Delta B$		$-\Delta B_{cb}$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$		$+\Delta e * p_e$				0
Σ	0	0	0	0	0	0		0	0



	Households	Production firms	Banks	Government	Central bank	Σ
Loans		$-L$	$+L$			0
Cash	$+H_h$		$+H_b$		$-H$	0
Deposits	$+M$		$-M$			0
Bills	$+B_h$		$+B_b$	$-B$	$+B_{cb}$	0
Equities	$+e * p_e$	$-e_f * p_e$	$-e_b * p_e$			0
Tangibile capital	$+K_h$	$+K_f$				$+K$
Sum (net worth)	NW_h	NW_f	NW_b	NW_g	0	$-K$
Σ	0	0	0	0	0	0

Stock-Flow-Consistency

3 Godley & Lavoie

		Production Firm		Banks			central Bank		
	Households (1)	Current (2)	Capital (3)	Current (4)	Capital (5)	Government (6)	Current (7)	Capital (8)	Σ
Consumption	$-C$	$+C$							0
Govt. expenditure		$+G$				$-G$			0
Investment		$+I$	$-I$						0
Wages	$+WB$	$-WB$							0
Profits, firms	$+FD_f$	$-F_f$	$+FU_f$						0
Profits, banks	$+FD_b$			$-F_b$	$+FU_f$				0
Profits, CB						$+F_{cb}$	$-F_{cb}$		0
Loan interest	$-r_{l(-1)} * L_{h(-1)}$	$-r_{l(-1)} * L_{f(-1)}$		$+r_{l(-1)} * L_{(-1)}$					0
Deposit interest	$+r_{m(-1)} * M_{h(-1)}$			$-r_{m(-1)} * M_{(-1)}$					0
Bill interest	$+r_{b(-1)} * B_{h(-1)}$			$+r_{b(-1)} * B_{b(-1)}$		$-r_{b(-1)} * B_{(-1)}$	$+r_{b(-1)} * B_{cb(-1)}$		0
Tax net of transfers	$-T_h$	$-T_f$		$-T_b$		$+T$			0
Change in loans	$+\Delta L_f$		$+\Delta L_f$		$-\Delta L$				0
Change in cash	$-\Delta H_h$				$-\Delta H_b$			$+\Delta H$	0
Change in deposits	$-\Delta M$				$+\Delta M$				0
Change in bills	$-\Delta B_h$				$-\Delta B_{hb}$	$+\Delta B$		$-\Delta B_{cb}$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$		$+\Delta e * p_e$				0
Σ	0	0	0	0	0	0		0	0

Quadruple-entry bookkeeping

3 Godley & Lavoie

		Production Firm		Banks			central Bank		
	Households (1)	Current (2)	Capital (3)	Current (4)	Capital (5)	Government (6)	Current (7)	Capital (8)	Σ
Consumption	$-C$	$+C$							0
Govt. expenditure		$+G$				$-G$			0
Investment		$+I$	$-I$						0
Wages	$+WB$	$-WB$							0
Profits, firms	$+FD_f$	$-F_f$	$+FU_f$						0
Profits, banks	$+FD_b$			$-F_b$	$+FU_f$				0
Profits, CB						$+F_{cb}$	$-F_{cb}$		0
Loan interest	$-r_{l(-1)} * L_{h(-1)}$	$-r_{l(-1)} * L_{f(-1)}$		$+r_{l(-1)} * L_{(-1)}$					0
Deposit interest	$+r_{m(-1)} * M_{h(-1)}$			$-r_{m(-1)} * M_{(-1)}$					0
Bill interest	$+r_{b(-1)} * B_{h(-1)}$			$+r_{b(-1)} * B_{b(-1)}$		$-r_{b(-1)} * B_{(-1)}$	$+r_{b(-1)} * B_{cb(-1)}$		0
Tax net of transfers	$-T_h$	$-T_f$		$-T_b$		$+T$			0
Change in loans	$+\Delta L_f$		$+\Delta L_f$		$-\Delta L$				0
Change in cash	$-\Delta H_h$		$-\Delta H_f$		$-\Delta H_b$			$+\Delta H$	0
Change in deposits	$-\Delta M$				$+\Delta M$				0
Change in bills	$-\Delta B_h$				$-\Delta B_{hb}$	$+\Delta B$		$-\Delta B_{cb}$	0
Change in equities	$-\Delta e * p_e$		$+\Delta e * p_e$		$+\Delta e * p_e$				0
Σ	0	0	0	0	0	0		0	0



Table of Contents

4 Onomastic & Data Structures

- ▶ History
- ▶ SFC
- ▶ Godley & Lavoie
- ▶ Onomastic & Data Structures



Onomastics

4 Onomastic & Data Structures

- Claudio Dos Santos's 2003 PhD dissertation at The New School for Social Research: "Three Essays on Stock-Flow Consistent Macroeconomic Modeling"
- Other names have been proposed along the way: "real stock-flow monetary model", "the financial stock-flow coherent approach", "the sectorial stock-flow coherent approach"
- Source of Confusion:
 1. "hydraulic", "accounting, not economics"
 2. other models are Stock-Flow Consistent



Onomastics

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- Accounting consistency important : "often, the best way to attack a problem in economics is to make sure that the accounting is right"
- Accounting structure brings together the real and financial sides of the economy
- SFC approach goes beyond accounting. Closure is important (demand-led/not full employment)



Data Sources

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Data Sources

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Bureau of Economic Analysis-National Income & Product Accounts (NIPA)



Data Sources

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Bureau of Economic Analysis-National Income & Product Accounts (NIPA)

Federal Reserve-Financial Accounts of the United States

BEA-Integrated Macroeconomic Accounts for the United States



Data Sources

4 Onomastic & Data Structures



Data Sources

4 Onomastic & Data Structures

United Nations Statistics



Data Sources

4 Onomastic & Data Structures

United Nations Statistics

World Development Indicators



European Central Bank



Data Sources

4 Onomastic & Data Structures

United Nations Statistics

World Development Indicators

IMF, World Economic Outlook Database

European Central Bank

Eurostat



Data Sources

4 Onomastic & Data Structures

United Nations Statistics

World Development Indicators

IMF, World Economic Outlook Database

European Central Bank

Eurostat

AMECO



Data Sources

4 Onomastic & Data Structures

United Nations Statistics

World Development Indicators

IMF, World Economic Outlook Database

European Central Bank

Eurostat

AMECO

OECD Statistics



Data Sources

4 Onomastic & Data Structures

United Nations Statistics

World Development Indicators

IMF, World Economic Outlook Database

European Central Bank

Eurostat

AMECO

OECD Statistics

National Statistical Offices and Central Banks





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Q&A



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