From Abstract to Concrete
Some Tips to Develop an Empirical SFC Model

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Introduction

Aim & model type
Tips to develop a medium-scale empirical SFC model. A theory-constrained but data-driven method is used. Inspired by Godley & Lavoie (2006) and Burgess et al. (2016).
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The model is built upon Eurostat database & SNA. No dynamic optimisation / no representative agent. Macro-accounting approach: evolution of BS and TFM entries under different scenarios.
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**Project**
Data for Italy are used, but it can be replicated for other countries. Aim: create network of interacting ‘personal’ SFC models (using R).
Reclassification

A ‘practical’ question

Increasing popularity of SFCMs since the publication of *Monetary Economics* (Godley & Lavoie 2006). Numerical simulations and cross-breeding with AB and IO. But seldom empirical models.
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Bridging the gap...
...using Eurostat data: a) available and downloadable through *pdfetch*; b) uniform across countries; c) useful reclassification proposed by Godin (2016).
Reclassification (cont’d)

First step: the full TFM
Matching SFC TFM with Eurostat accounting.

<table>
<thead>
<tr>
<th>Entries (Italy, 2015)</th>
<th>Eurostat Code</th>
<th>Non-Financial Corporation</th>
<th>Financial Corporations</th>
<th>Government</th>
<th>Households</th>
<th>Rest of World</th>
<th>Total economy (row total)</th>
<th>S1</th>
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<tr>
<td>Gross Output</td>
<td>P1</td>
<td>2095694</td>
<td>130440</td>
<td>360245</td>
<td>580440</td>
<td>0</td>
<td>3112819</td>
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<td>Intermediate Consumption</td>
<td>P2</td>
<td>-130170</td>
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<td>-60062</td>
<td>-126658</td>
<td>0</td>
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<td>Taxes on Product</td>
<td>D21</td>
<td>0</td>
<td>0</td>
<td>189354</td>
<td>0</td>
<td>2251</td>
<td>191905</td>
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<tr>
<td>Subsidies on Products</td>
<td>D31</td>
<td>0</td>
<td>24499</td>
<td>0</td>
<td>-187</td>
<td>-24539</td>
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<td>Memo. GDP</td>
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<td>735524</td>
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<td>381036</td>
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<td>Consumption</td>
<td>P3</td>
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<td>-311639</td>
<td>-100114</td>
<td>0</td>
<td>-1312953</td>
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<td>Exports</td>
<td>P8</td>
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<td>0</td>
<td>0</td>
<td>-403934</td>
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<td>Imports</td>
<td>P7</td>
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<td>446042</td>
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<td>-446042</td>
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<td>Investment</td>
<td>P5 (G)</td>
<td>-149586</td>
<td>-4429</td>
<td>-38959</td>
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<td>0</td>
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<tr>
<td>Total Production</td>
<td></td>
<td>585966</td>
<td>71582</td>
<td>32440</td>
<td>-644181</td>
<td>-45808</td>
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<tr>
<td>Wages</td>
<td>D1</td>
<td>-411085</td>
<td>-32355</td>
<td>-161998</td>
<td>60723</td>
<td>-4284</td>
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<tr>
<td>Taxes on Production and Imports</td>
<td>D2**</td>
<td>-26526</td>
<td>-5735</td>
<td>240236</td>
<td>-18620</td>
<td>-189354</td>
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<td>Subsidies on Production</td>
<td>D3</td>
<td>4347</td>
<td>4</td>
<td>-28481</td>
<td>3922</td>
<td>20201</td>
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<td>Dividends</td>
<td>D42</td>
<td>-109941</td>
<td>-1633</td>
<td>4271</td>
<td>114625</td>
<td>-7322</td>
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<td>Interests payments</td>
<td>D41</td>
<td>-5209</td>
<td>18574</td>
<td>-65237</td>
<td>30759</td>
<td>21113</td>
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<td>Other property income</td>
<td>D43</td>
<td>-11895</td>
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<td>3924</td>
<td>23481</td>
<td>1812</td>
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<td>Taxes on Income and Wealth</td>
<td>D5</td>
<td>-27099</td>
<td>-6022</td>
<td>241582</td>
<td>-204845</td>
<td>-12200</td>
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<tr>
<td>Social Benefits (net of social contributions)</td>
<td>D6**</td>
<td>1273</td>
<td>2461</td>
<td>-113732</td>
<td>112607</td>
<td>-2609</td>
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<tr>
<td>Other Current Transfers</td>
<td>D7</td>
<td>-5061</td>
<td>-1075</td>
<td>-6476</td>
<td>-6232</td>
<td>18844</td>
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<tr>
<td>Adjustments in Pension Funds</td>
<td>D8</td>
<td>-1272</td>
<td>-2461</td>
<td>0</td>
<td>3733</td>
<td>0</td>
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<td>Capital Transfers</td>
<td>D9</td>
<td>18031</td>
<td>8294</td>
<td>-25421</td>
<td>2889</td>
<td>-3792</td>
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<tr>
<td>Total Transfers</td>
<td></td>
<td>-575309</td>
<td>-37170</td>
<td>86668</td>
<td>670409</td>
<td>-146597</td>
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<tr>
<td>Sum Production and Transfers</td>
<td></td>
<td>10657</td>
<td>34412</td>
<td>121108</td>
<td>26228</td>
<td>-192405</td>
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<tr>
<td>Acquisition less consumption of NPNFP</td>
<td>NP</td>
<td>-1535</td>
<td>-18</td>
<td>-420</td>
<td>789</td>
<td>1184</td>
<td>0</td>
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<tr>
<td>Tax - subsidies on product</td>
<td>-D21+D31</td>
<td>0</td>
<td>0</td>
<td>-164885</td>
<td>0</td>
<td>164885</td>
<td>0</td>
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<tr>
<td>Computed Net Lending Position</td>
<td>B9</td>
<td>9123</td>
<td>34394</td>
<td>-44197</td>
<td>27017</td>
<td>-26336</td>
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<tr>
<td>Total by sector (column total)</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Note: Italy, 2015, current prices, million euro.
SECOND STEP: ‘WHO PAYS WHOM’

Address issues with Figure 1:  
a) Lines 6 to 9 do not sum up to zero;  
b) too many entries. Assume firms produce it all!

Note: Italy, 2015, current prices, million euro.
Reclassification (cont’d)

Third step: merging entries

Merge taxes, transfers and other ‘secondary’ entries to get the accounting structure of the model.

Note: Italy, 2015, current prices, million euro.
**Reclassification (cont’d)**

**Fourth step: the balance sheet**

Narrowed down creating ‘other financial assets’ composite entry (insurance tech. reserves, derivatives and other).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Assets</td>
<td>Liabilities</td>
<td>Net</td>
<td>Assets</td>
</tr>
<tr>
<td>Non-financial assets (dwellings)</td>
<td>N1N-N2N</td>
<td>160,249.6</td>
<td>0.0</td>
<td>160,249.6</td>
<td>4,761.2</td>
</tr>
<tr>
<td>Currency and deposits</td>
<td>F2</td>
<td>308,930.0</td>
<td>32,763.0</td>
<td>276,167.0</td>
<td>329,009.0</td>
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<tr>
<td>Securities other than shares</td>
<td>F3</td>
<td>57,048.0</td>
<td>145,002.0</td>
<td>-88,954.0</td>
<td>675,684.0</td>
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<tr>
<td>Loans</td>
<td>F4</td>
<td>18,947.0</td>
<td>1,067,001.0</td>
<td>-1,048,054.0</td>
<td>1,823,350.0</td>
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<tr>
<td>Shares and other equity</td>
<td>F5</td>
<td>525,651.0</td>
<td>1,666,671.0</td>
<td>-1,141,020.0</td>
<td>632,956.0</td>
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<tr>
<td>Other financial assets</td>
<td></td>
<td>16,886.0</td>
<td>101,558.0</td>
<td>-84,672.0</td>
<td>6,358.0</td>
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<tr>
<td>Insurance technical reserves</td>
<td>F6</td>
<td>15,425.0</td>
<td>14,307.0</td>
<td>1,118.0</td>
<td>125,954.0</td>
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<tr>
<td>Derivatives and empl. stock options</td>
<td>F7</td>
<td>147,171.0</td>
<td>91,328.0</td>
<td>55,845.0</td>
<td>29,446.0</td>
</tr>
</tbody>
</table>

*Note: Italy, 2015, current prices, million euro.*
Developing the model

Features and assumptions
Developing the model

Features and Assumptions

- Discrete-time macro (econometric) model. 5 sectors: households, NFCs, government, banks, foreign sector.
Developing the model

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- Eurostat data and stock-flow consistent framework (ESSFC)
Developing the model

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- Distribution is determined by institutional & political factors ($\beta_j$)
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- Demand-led both in the short- and long-run
- Constant prices (2010) and national currency (Euro)
- Output produced by firms only on behalf of other sectors
- Distribution is determined by institutional & political factors ($\beta_j$)
- Each sector is marked by either a portfolio function or a simple financial investment rule
Developing the model (cont’d)

I

Usually, net stocks of financial assets and liabilities

Simplifying hypotheses about sectoral portfolio compositions

Central bank, commercial banks and NBFIs: integrated and consolidated sector
Developing the model (cont’d)

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Developing the model (cont’d)

ESSFC position along Pagan’s ‘best practice’ frontier of models

(a) Conventional or orthodox models
(b) Unconventional or heterodox models

Theoretical coherence

Classical DSGE
New Keynesian DSGE
Structural macroeconometric
SVAR
VAR

Empirical coherence

Goodwin-Minsky
SFC, AB, SM
ESSFC
Levy-like SFC and I-O
VAR

Empirical coherence
Households: selected identities

Households disposable income (from TFM)

\[ YD = GDP_H + WB - \tau_H + INT_H + T_H + ANN_H \]

where: \( GDP_H = \beta_H \cdot GDP \).
**Households: selected identities**

**Households disposable income (from TFM)**

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**Household net wealth (from BS)**

\[ NW_H = HOUSE_H + D_H + V_H + B_H + OFIN_H - L_H \]
**Households: selected identities**

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**Household net wealth (from BS)**

\[ NW_H = HOUSE_H + D_H + V_H + B_H + OFIN_H - L_H \]

**Net lending by households (key variable)**

\[ NL_H = YD + NFUNDS - CONS_H - INV_H \]
HOUSEHOLDS: SELECTED BEHAVIOURAL

CONSUMPTION FUNCTION

\[ C_H = c_0 + c_1 \cdot E(YD) + c_2 \cdot NW_{H,-1} + c_3 \cdot C_{H,-1} \]
HOUSEHOLDS: SELECTED BEHAVIOURAL

CONSUMPTION FUNCTION

\[ C_H = c_0 + c_1 \cdot E(YD) + c_2 \cdot NW_{H,-1} + c_3 \cdot C_{H,-1} \]

HOUSEHOLD INVESTMENT

\[ INV_H = \vartheta_1 \cdot INV_{H,-1} + \vartheta_2 \cdot L_{H,-1} + \vartheta_3 \cdot HOUSE_{H,-1} + \]
\[ + \vartheta_4 \cdot YD_{H,-1} + \vartheta_5 \cdot E(r_H) \]
HOUSEHOLDS: SELECTED BEHAVIOURAL

CONSUMPTION FUNCTION

\[ C_H = c_0 + c_1 \cdot E(YD) + c_2 \cdot NW_{H,-1} + c_3 \cdot C_{H,-1} \]

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\[ + \vartheta_4 \cdot YD_{H,-1} + \vartheta_5 \cdot E(r_H) \]

DEMAND FOR MORTGAGES & OTHER LOANS

\[ L_H = L_{H,-1} + \phi_1 \cdot YD_{-1} + \phi_2 \cdot HOUSE_{H,-1} + \phi_3 \cdot INV_{H,-1} \]
HOUSEHOLDS: PORTFOLIO CHOICE

EQUITY & SHARES

\[ \frac{V_H}{E(NFW_H)} = \lambda_{1,0}^H + \lambda_{1,1}^H \cdot E(r_V) + \lambda_{1,2}^H \cdot \frac{E(YD_H)}{E(NFW_H)} + \lambda_{1,3}^H \cdot E(r_{BA}) \]

where \( \lambda_{1,j} \) are empirically estimated. The same goes for \( D_H \) and \( B_H \). Note: \( r_D = 0 \).
Households: portfolio choice

Equity & shares

\[
\frac{V_H}{E(NFW_H)} = \lambda_{1,0}^H + \lambda_{1,1}^H \cdot E(r_V) + \lambda_{1,2}^H \cdot \frac{E(YD_H)}{E(NFW_H)} + \lambda_{1,3}^H \cdot E(r_{BA})
\]

where \(\lambda_{1,j}\) are empirically estimated. The same goes for \(D_H\) and \(B_H\). Note: \(r_D = 0\).

Other financial assets

\[
OFIN_H = \sigma_{OFIN}^H \cdot NW_H
\]

When residual correction mechanism is used, \(OFIN_H\) is redefined as the residual share (\(\sigma_{OFIN}^H\)) of net wealth.
NFCs: selected identities

**Gross domestic product**

\[ GDP = Y - CONS_{INT} + \tau_P^{NET} \]
NFCs: selected identities

**Gross Domestic Product**

\[ GDP = Y - CONS_{\text{INT}} + \tau_P^{\text{NET}} \]

**Aggregate Demand**

\[ Y_{\text{AD}} = CONS_H + CONS_G + INV + CONS_{\text{INT}} + EXP - IMP - \tau_T^{\text{NET}} \]
NFCs: selected identities

**Gross domestic product**

\[ GDP = Y - CONS_{INT} + \tau_P^{NET} \]

**Aggregate demand**

\[ Y_{AD} = CONS_H + CONS_G + INV + CONS_{INT} + EXP - IMP - \tau_T^{NET} \]

**Net lending by NFCs**

\[ NL_F = \Pi_{FU} - INV_F \]
**NFCs: selected behavioural**

**Total investment**

\[ INV = K_{-1} \cdot (g_K + \delta_K) \]
Total investment

\[ INV = K_{-1} \cdot (g_K + \delta_K) \]

Growth rate of capital

\[ g_K = \gamma_Y + \gamma_U \cdot E \left( \frac{Y}{K} \right) + \gamma_P \cdot E \left( \frac{\Pi_F}{K} \right) - \gamma_Z \cdot E(r_Z) - \gamma_R \cdot E(r_{L,F}) \]
NFCs: selected behavioural

**Total investment**

\[ INV = K_{-1} \cdot (g_K + \delta_K) \]

**Growth rate of capital**

\[ g_K = \gamma_Y + \gamma_U \cdot E \left( \frac{Y}{K} \right) + \gamma_N \cdot E \left( \frac{\Pi_F}{K} \right) - \gamma_Z \cdot E(r_Z) - \gamma_R \cdot E(r_{L,F}) \]

**Import**

\[ IMP = IMP_{-1} \cdot \exp \left( \mu_1 + \mu_2 \cdot \ln \left( \frac{Y}{Y_{-1}} \right) + \mu_3 \cdot (NER - NER_{-1}) \right) \]
NFCs: supply side?

**Leonifef function**

\[ Y_n = \min(Y_n^L, Y_n^K) \]
NFCs: supply side?

**Leontief function**

\[ Y_n = \min(Y^L_n, Y^K_n) \]

where:

\[ \log(Y^L_n) = \nu_0^L + \nu_1^L \cdot \log(N) + \nu_2^L \cdot t \]
NFCs: supply side?

**Leontief Function**

\[ Y_n = \text{min}(Y_n^L, Y_n^K) \]

where:

\[ \log(Y_n^L) = \nu_0^L + \nu_1^L \cdot \log(N) + \nu_2^L \cdot t \]

and:

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NFCs: supply side?

Leontief function

\[ Y_n = \min(Y_n^L, Y_n^K) \]

where:

\[ \log(Y_n^L) = \nu_0^L + \nu_1^L \cdot \log(N) + \nu_2^L \cdot t \]

and:

\[ \log(Y_n^K) = \nu_0^K + \nu_1^K \cdot \log(K) + \nu_2^K \cdot t \]

Note: ‘normal times’; used to determine \( p_Y \) and \( p_K \), not \( Y \).
Government

\[ NL_G = GOV_{REV} - GOV_{SP} - INT_G \]
**Net Lending by Other Sectors**

**Government**

\[ NL_G = GOV_{REV} - GOV_{SP} - \text{INT}_G \]

**Banks & NBFIs**

\[ NL_B = \Pi_B - DIV_B - INV_B \]
Net lending by other sectors

**Government**

\[ NL_G = GOV_{REV} - GOV_{SP} - INT_G \]

**Banks & NBFIs**

\[ NL_B = \Pi_B - DIV_B - INV_B \]

**Rest of the world**

\[ NL_{RoW} = -(NL_H + NL_F + NL_G + NL_B) \]
Cross-sector Holdings and Payments

Who holds what

Sectoral portfolios are different in terms of asset types’ composition (shares, securities, deposits). However, each sector $i$ (e.g. government) holds the same proportion of $x$-type assets (e.g. bonds) issued by $j$ to total $x$. Coherent with the hypothesis that $x$-type assets carry all the same average return rate.
Cross-sector holdings and payments

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Sectoral portfolios are different in terms of asset types’ composition (shares, securities, deposits). However, each sector $i$ (e.g. government) holds the same proportion of $x$-type assets (e.g. bonds) issued by $j$ to total $x$. Coherent with the hypothesis that $x$-type assets carry all the same average return rate.

Who pays whom
Seldom dividends received by $i$ mirror its holdings. Two steps: $a)$ total dividends received by $i$ are corrected to fit empirical evidence ($DIV_i = \epsilon_i \cdot DIV_{TOT} \cdot V_i / V_{TOT}$, where $\epsilon_i$ is the correction coefficient); $b)$ each ‘issuing’ sector $j$ pays the same proportion ($\delta_j = DIV_j / DIV_{TOT}$) of total dividends to every other sector (so: $DIV_{j,i} = \delta_j \cdot DIV_i$). The same goes for interest payments.
Data estimation and calibration

Methods
Initial stocks & lagged variables are set at 1996 value. Unknown coefficients can be: a) estimated; b) calibrated = data; c) calibrated = literature; d) fine-tuned to create baseline. Theoretical SFCMs are set up via c and d. ESSFC coefficients are defined by a and b.
DATA ESTIMATION AND CALIBRATION

METHODS
Initial stocks & lagged variables are set at 1996 value. Unknown coefficients can be: a) estimated; b) calibrated = data; c) calibrated = literature; d) fine-tuned to create baseline. Theoretical SFCMs are set up via c and d. ESSFC coefficients are defined by a and b.

DATASET
**Data estimation and calibration**

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Initial stocks & lagged variables are set at 1996 value. Unknown coefficients can be: *a*) estimated; *b*) calibrated = data; *c*) calibrated = literature; *d*) fine-tuned to create baseline. Theoretical SFCMs are set up via *c* and *d*. ESSFC coefficients are defined by *a* and *b*.

**Dataset**

**Estimation**
Key equations: coefficients estimated one at time by simple OLS. *Pros*: simplify coding (intermediate step). *Cons*: endogeneity, spurious correlation. Note: MOVAV for several key exogenous ratios.
SOFTWARE TECHNICALITIES

Programs’ structure

- Eurostat Database
  - Data source
- Excel BS and TFM
  - Take snapshot that helps write program
- R files
  - Download data
  - Create new series
- EViews program
  - Manipulate data
  - Estimate coefficients
  - Attribute values to parameters and variables
  - Plot actual and simulated time series
- Excel accounting sheet
  - Collect and organise data
  - Create alternate scenarios and compare with baseline
Running the simulations

Fitting past data and forecasting
Residuals assumed to reduce steadily up until $t_0$ and are unwound afterwards. For $t \leq t_0$, the estimate value of $x$, corrected to improve the fit, is:

$$x_t^* = e^{-\mu \cdot \frac{t}{t_0-t}} \cdot (x^f_t - \bar{x}_t) + \bar{x}_t$$

where $x^f_t$ is the forecast value of $x$ at $t$ and $\bar{x}_t$ is the actual (average) value of $x$. 
Running the simulations

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where $x_t^f$ is the forecast value of $x$ at $t$ and $\bar{x}_t$ is the actual (average) value of $x$.

So, $x_t^* \rightarrow x_t^f$, for $t \rightarrow 0$; while $x_t^* \rightarrow \bar{x}_t$ (or $x_t$) for $t \rightarrow t_0$. 
**Running the simulations**

**Fitting past data and forecasting (cont’d)**

For $t > t_0$, the estimate value of $x$, corrected to smooth the transition, is:

$$x_t^* = e^{-\mu(T-t_0)} \cdot (\bar{x}_t - x_t^f) + x_t^f$$  \hspace{1cm} (2)

So, $x_t^* \to \bar{x}_t$ for $t \to t_0$; while $x_t^* \to x_t^f$, for $t \to +\infty$.  

Future (predicted) residuals are allowed to increase gradually. Model’s forecast value departs gradually from the last observed (average) value.
Running the simulations

Fitting past data and forecasting (cont’d)

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Fitting past data and forecasting (cont’d)

This simple mechanism creates a moving ceiling for residuals, which: a) improve artificially estimates of stochastic variables; b) reset identities (e.g. net lending).
Running the simulations

Fitting past data and forecasting (cont’d)

This simple mechanism creates a moving ceiling for residuals, which: a) improve artificially estimates of stochastic variables; b) reset identities (e.g. net lending).

Note: option (b) requires identifying a ‘residual’ or ‘buffer’ variable to absorb the estimation difference (i.e. $x_t^* - x_t^f$). ‘Adjustment in funds’ is used by ESSFC.
Running the simulations

Fitting past data and forecasting (cont’d)

A. Household consumption for \( \mu = 0.1 \) (ESSFC)

B. Household consumption for other values of \( \mu \)

<table>
<thead>
<tr>
<th>Year</th>
<th>Simulated (( \mu = 0.01 ))</th>
<th>Simulated (( \mu = 0.1 ))</th>
<th>Simulated (( \mu = 1 ))</th>
<th>Simulated (( \mu = 10 ))</th>
<th>Actual series</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>880,000</td>
<td>980,000</td>
<td>960,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>2005</td>
<td>940,000</td>
<td>1,000,000</td>
<td>960,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>2010</td>
<td>900,000</td>
<td>920,000</td>
<td>900,000</td>
<td>980,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>2015</td>
<td>880,000</td>
<td>900,000</td>
<td>880,000</td>
<td>960,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>2020</td>
<td>920,000</td>
<td>960,000</td>
<td>920,000</td>
<td>980,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>2025</td>
<td>980,000</td>
<td>1,000,000</td>
<td>980,000</td>
<td>1,000,000</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>
Running the simulations

Fitting past data and forecasting (cont’d)

Possible capital gains/losses (revaluation effect) are assumed away on government bonds. As for other financial and real assets, the revaluation effect is automatically accounted for, as stocks at time $t$ are defined as stocks at time $t-1$ plus changes in stocks’ value from $t-1$ to $t$. 
Running the simulations

Cross-sector financial balances since 1996 (percentage of GDP)

A. Household net lending (% GDP)
B. SFC net lending (% GDP)
C. Government net lending (% GDP)
D. Financial sector net lending (% GDP)
E. Rest of world net lending (% GDP)
F. Sectoral residuals (absolute value to GDP)
Running the simulations

Data fit and forecast
Running the simulations

Data fit and forecast

- Correction mechanism allows perfect match with last observation
Running the simulations

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- Each crisis affects ESSFC predicting power (pikes in residuals)
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- Neither a mere static simulation nor a narrowly-defined dynamic one
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- Medium-run forecast: additional hypotheses on coefficients are required
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- Each crisis affects ESSFC predicting power (pikes in residuals)
- Neither a mere static simulation nor a narrowly-defined dynamic one
- Middle ground: dynamic simulation, but ceiling for residuals and moving averages
- Medium-run forecast: additional hypotheses on coefficients are required
- Useful to impose and compare different scenarios
Running the simulations

Alternative scenarios

Three alternative scenarios about government spending:
Running the simulations

Alternative scenarios

Three alternative scenarios about government spending:

- Baseline scenario: historical trend (black line)
Running the simulations

Alternative scenarios

Three alternative scenarios about government spending:

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- Austerity: permanent cut in government consumption (-1% of GDP, blue line)
Running the simulations

Alternative scenarios

Three alternative scenarios about government spending:

- Baseline scenario: historical trend (black line)
- Austerity: permanent cut in government consumption (-1% of GDP, blue line)
- Profligacy: increase in government consumption (+1% of GDP, red line)
Running the simulations

ESSFC reaction following shocks to government spending
ESSFC reaction following shocks to government spending (cont’d)
Running the simulations

Developments and limitations
Running the simulations

Developments and limitations

- Standard deviation is quite high (poor estimates)
Running the simulations

Developments and limitations

- Standard deviation is quite high (poor estimates)
- Low frequency and short series
RUNNING THE SIMULATIONS

DEVELOPMENTS AND LIMITATIONS

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- Use cointegration, instrumental variables, other econometrics
Running the simulations

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RUNNING THE SIMULATIONS

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- Microfoundations?
Final remarks

Despite limitations above, ESSFC can be replicated for a variety of sub-sectors, variables, shocks and alternative scenarios. It allows monitoring stock-flow norms, which can possibly help detect early signs of economic & financial fragility and crises.
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Useful benchmark for PhD students, early-career researchers, non-neoclassical macro-modellers, and the practitioners who want to expand their own set of analytical tools.
Thank You
m.passarell@leeds.ac.uk

Download presentation’s material from marxianomics:
www.marcopassarella.it/en/
Appendix A: Dependency Graph

Legend:
- Orange: Lags Only
- Red: Lags + Contemporaneous
- Black: Contemporaneous Only

Dashed lines indicate the presence of lags/leads of length four or more.
Appendix B: Housing Market

Housing price index is a function of households’ debt to income ratio ($m_H = MORT_H / YD_H$):

$$p_H = h \cdot m_H \cdot \frac{E(YD_H)}{HOUSE_H}$$

where $h =$ sensitivity of housing prices to household debt.

Capital gains/losses on housing are:

$$CG_H = HOUSE_{H,-1} \cdot \frac{d(p_H)}{p_{H,-1}}$$

Housing investment can be now re-defined:

$$INV_H = \vartheta_0 + \vartheta_1 \cdot INV_{H,-1} + \vartheta_2 \cdot MORT_{H,-1} + \vartheta_3 \cdot p_{H,-1}$$


