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Empirical stock-flow consistent models

Editorial to the special issue

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This Special Issue is a collection of some contributions presented to the first workshop on empirical stock-flow consistent (SFC) models, organized at the Aalborg University, Denmark, in September 2023.

In the past 25 years or so, stock-flow consistent models have been adopted by a growing number of new research contributions to macroeconomics, which do not rely on micro-foundations and the general equilibrium approach. The reason for the success of this approach stems from the effectiveness in dealing in an appropriate way with the integrated analysis of real and financial markets. In addition, the flexibility of the approach makes it an excellent candidate for the development of models that go beyond the economy to analyze the interactions with the environment, the use of exhaustible resources, etc.

The interested reader is referred to the most influential contribution to the SFC approach in Godley and Lavoie (2007) and to the following surveys: Caverzasi and Godin (2015), Nikiforos and Zezza (2017) and Carnevali et al. (2019).

The purpose of the 2023 Aalborg workshop was to connect individuals and research groups who focused more specifically on SFC models estimated or calibrated to data for whole countries, rather than on simpler theoretical models.

The contribution by *Christos Pierros* provides a useful survey of empirical SFC models for whole countries. The author proposes a taxonomy, suggesting that these models have developed from (a) *New Cambridge*¹ 3-sector models considering the private sector as a whole, along with the government and the foreign sector (NC models); (b) Godley–Lavoie type models, based on the seminal work of Godley and Lavoie (2007), where the private sector is split into Households, Non-financial businesses and one or more types of financial institutions (GL models); and (c) models with a High degree of Complexity, which have appeared more recently (HC models).

A comprehensive list of contributions in the three groups is presented and discussed, stressing that models in the last category vary substantially according to the main research question they aim to address.

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1. This label is associated with the work of Francis Cripps, Wynne Godley and their associates in Cambridge (UK) in the 1970s–1980s. See Cripps and Godley (1976) amongst others.

According to Pierros, a higher degree of complexity, however, comes at the cost of a worse goodness of fit against actual data, mainly for the volatility of financial markets. The author concludes with suggestions on how to improve such models with a better specification of the productive structure and both financial and labor markets.

The paper by *Huub Meijers* and *Joan Muysken*, 'Theory and measurement in SFC models: the role of the financial sector', refers to an SFC model for the Dutch economy developed by the authors² to illustrate all data collection and manipulation problems that arise in the construction and calibration of an SFC model for a whole country. Their model falls into Pierros' HC category, with a detailed discussion on institutions often ignored in other SFC models, such as Pension Funds. They also point out well-known problems with verifying the consistency of published data, namely the reconciliation of flow data coming from national accounts to financial data in the flow of funds and balance sheets. The authors describe how such problems can be overcome with appropriate assumptions.

The other papers refer to SFC models for specific countries.

The contribution by *Laurentjoye and colleagues* from Aalborg University, 'Flexibility in design: the multiple applications of a medium-sized empirical model for Denmark', shows the benefits of choosing a model structure that is neither too simple nor too complex, providing the flexibility needed to address different research questions relative to the country under study.

The model for Denmark is used to address different topics: (1) determining whether the Danish economy is wage led or profit led, showing complex relationship between demand, income distribution and growth, which do not imply a clear categorization, thus allowing for possible switches between the two regimes; (2) discussing the effectiveness of monetary policy to address inflationary pressures in the post-COVID phase, with results showing that coordination between fiscal and monetary policy would be more effective in reducing inflation, whilst having less perverse effects on real GDP growth; (3) studying the determinants of the growing current account surplus of Denmark after 2010; and (4) analyzing the potential impact of a reduction in unemployment benefits.

Chong, Mazier and *Reyes*, 'Macroeconomic policy evaluation in an SFC econometric model: the case of the investment programme for climate action in France', presents an analysis of the investment program for climate action in France, using an SFC model built following previous work by some of the same authors, modified to handle the specificities of the proposed low-carbon transition in the country.

Model simulation shows that the impact of the proposed program has a much lower adverse effect on public finances with respect to other estimates, but a worse effect on the balance of payments. The model SFC structure allows to discuss sources of funds, as well as implications for wealth/debt accumulation of the different institutional sectors.

Francesco Zezza, 'Fiscal and monetary policy in an SFC model of the Italian economy', uses a relatively complex model of the Italian economy (*Zezza/Zezza 2022*) to evaluate the effects of fiscal and monetary policy on the country. The paper also discusses the differences of the model against other structural models of the Italian economy and provides evidence of the ability of the model to track historical data using dynamic simulation.

Last, but not least, a special session in the workshop was dedicated to research from younger scholars.

David An, 'Modelling the green transition of the Chinese economy', presents a sophisticated SFC model, which is expanded – with respect to other SFC models – to discuss the role of the energy sector and the impact of emissions. After the model description,

2. See Meijers and Muysken (2022).

the author discusses the results of alternative scenarios based on different carbon pricing policies.

The paper by *Simon Fløj Thomsen*, ‘The impact of environmental regulations on competitiveness and carbon leakage’, evaluates two alternative hypotheses: the ‘pollution haven’, which suggests that environmental regulations can positively affect country level competitiveness through green research and development, against the ‘Porter hypothesis’, suggesting that regulations imply higher production costs, with negative effects on productivity.

The author develops a two-area SFC model, calibrated to match key variables for the Danish economy, to simulate the effects of the introduction of environmental regulations, finding that the adverse effects on productivity are stronger in the short run, but positive effects prevail in the medium-long run, even in a small open economy like Denmark.

Overall, the contributions gathered in this Special Issue reflect the rapid progress that empirical stock-flow consistent modeling has made in recent years. From comparative surveys to detailed country studies, and from the analysis of macroeconomic stabilization policies to the challenges posed by climate change and the green transition, the papers illustrate the richness and flexibility of the SFC approach. They also highlight the ongoing methodological challenges, particularly regarding data consistency and the trade-off between model complexity and empirical fit. By bringing together diverse applications and perspectives, this collection provides both a state-of-the-art overview and a stimulus for further research, strengthening the role of empirical SFC models as a powerful tool for the study of contemporary macroeconomic issues.

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