Design and Development of Multi-agent Simulation Models of Icelandic Economy

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Introduction

In this project, a multi-agent model of Icelandic economy, the ICEACE Model, is developed. The project aims to understand the endogenous sources of instability in the financial system and to devise the relationship between credit supply, assets bubble and macroeconomic activity. The ICEACE simulator further aims to serve as an innovative and powerful computational facility for the assessment of economic scenarios and the design of policy measures, particularly, for macroeconomic policy and systemic risk assessment.
Model description details, implementation source codes, and pointers to publications are accessible at the project Web site [a].

[a] $http://iceace.github.io/home$

ICEACE Model in Very Brief

- **Agent Types:** Households, Firms, Banks, Fund, Central Bank, and Government
- Fictitious Agents: Real Estate Agency (housing market), Job Placement Office (labour market), and Mall (consumption goods market)
- **Markets:** Production, Consumption, Labour, Housing, and Crediting
- **Interaction:** Communication via Message Boards and Double Entry Book Keeping Mechanism
- **Synchronization:** Quarterly, Monthly, Weekly, Daily

Simulator Development Framework

FLAME (Flexible Large-scale Agent Modelling Environment) is an agent-based modelling system. It serves as the major multi-agent platform for the implementation of ICEACE model [a]

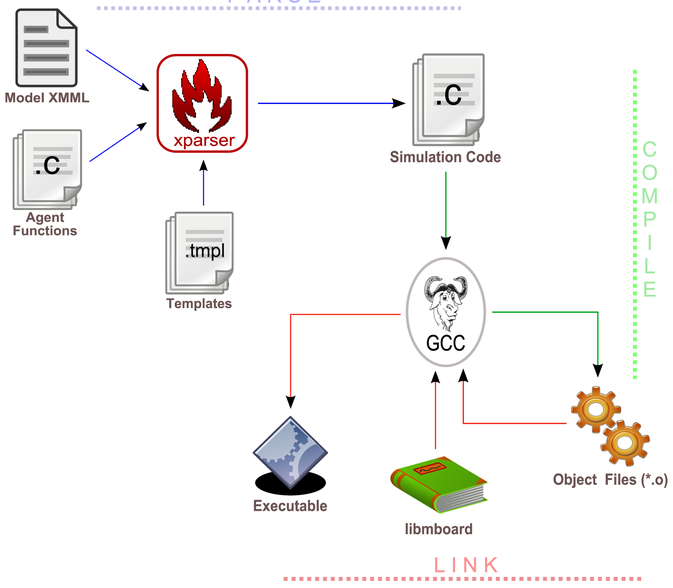


Fig. 1: FLAME Agent Based Modelling Process

Models descriptions are formatted in XML (Extensible Markup Language) tag structures. FLAME specific XML, so called XMML (eXtended Machine Markup Language) serves an easy human and computer readable description of agent types, agent memory variables, interaction in between agents, model parameters and environment variables.

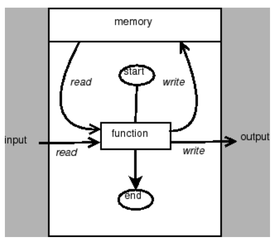
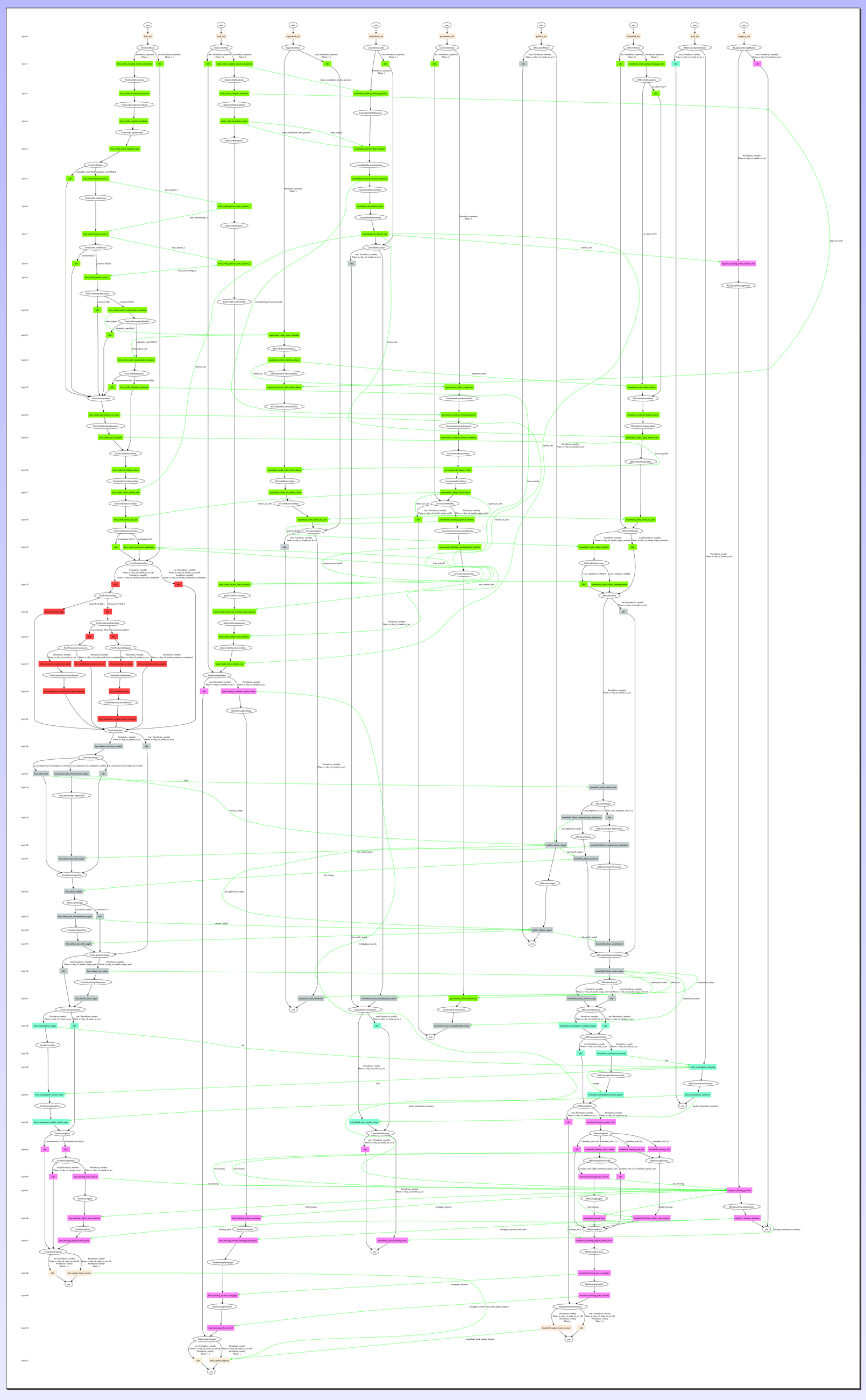


Fig. 2: XMachine Unit

Agent behaviors are additionally specified via XMachine formal descriptions. XMachine formalization provides specification of agent-agent, agent-environment interactions, as well as, changes and transitions of agent memory states.

[a] $http://www.flame.ac.uk/$

ICEACE Model, Overall State Transistion Graph



Acknowledgment

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