

Syllabus

[cmcd.economia@fgv.br]

Course Name: Introduction to HANK models

Faculty:

Teaching Assistants:

2025

COURSE OUTLINE

In this course students will be introduced to the new generation of New Keynesian Models featuring heterogeneous households – the so-called HANK, a so far promising marriage between end of the 1990s real models featuring heterogeneous agents, and the workhorse of modern monetary macro. As we will see, HANK honours Keynes' view of the macroeconomy much more than its predecessors by given prominence to income effects (who believes in intertemporal substitution anyways?!).

We start discussing the dissonance between the predictions of the standard single agent (RANK) model and what we observe in the trenches of the real world. Next, we go on to argue that models featuring heterogeneity and uninsurable idiosyncratic income risk can better match some of these patterns (and others, such as precautionary savings).

We then take a closer look at HANK's immediate predecessor, the Two Agents New Keynesian model, aka TANK. Some important differences already arise in this setting, like the demise of the Ricardian Equivalence which renders monetary policy effects fully dependent on how fiscal policy is structured. But although TANK models provide us with new insights and are much better at explaining empirical phenomena, heterogeneity in TANK is still very coarse and unrealistic (but easy to model). So, we move on to the heterogeneity-rich HANK models, first analytically to build intuition and then computationally.

Implementing HANK is not a walk in the park, because in this framework an infinite dimensional object becomes a state variable -- the wealth distribution. There are currently 3 major (actually more) ways to do HANK in the computer, two of which are associated with discrete time modelling and one with continuous time. We will discuss a bit of all of them but will focus on numerical methods for HANK in discrete time. Our scarce time and wits will be spent mostly in understanding the Sequence Space Jacobian method developed by Adrien Auclert and co-authors.

But before going full HANK in the computer, we will make a pit stop at HANC, where NC stands for New Classical (real variables allowed only), taking the bat from Tiago Cavalcanti precisely where he finishes his Macro III course: on the Ayagari-Hugget-Bewley model.

The discussion of standard numerical methods employed will be modest, except for what is relatively new and has not yet been incorporated into textbooks and/or traditional courses on numerical methods. Basic understanding of how to solve value functions, and some familiarity with the inner workings of a new Keynesian monetary model are quasi-mandatory.

COURSE PROGRAM

- Ø Introduction – why bother with heterogeneity? The empirical evidence on marginal propensities to consume. The birth of the TANK model. Measuring the number of Hands to Mouth with survey data.
- Ø RANK and TANK models and why we should move away from these. Ricardian equivalence and incredibly coarse heterogeneity (I might be overselling it).
- Ø Tractable HANK models, courtesy of Florin Bilbiie. Prepare for algebra.
- Ø A crash course in stochastic calculus (I myself do not know much), continuous time value functions and Finite Differences. A crash course in Discrete cosine transformation and statistical copulas. A crash course on sequence space (I know, so many crash courses)
- Ø The “Founding Fathers”: Rao Ayagari 1994 and Krusell and Smith 1998.
- Ø One asset HANK model; two assets HANK model, the fiscal multipliers under HANK.
- Ø Estimating HANK with Bayesian methods.

BIBLIOGRAPHY

1. Tom Sargent and Lars Ljungqvist, Recursive Macroeconomic Theory, 2nd or higher edition, chapters 17-19 on incomplete markets.
2. Kaplan and Violante, Microeconomic heterogeneity and Macroeconomic shocks, *Journal of Economic Perspectives*, 2018.
3. Kaplan, Moll and Violante. Monetary Policy according to HANK, *American Economic Review*, 2018.
4. Bilbiie, Florin. “The New Keynesian Cross”, *Journal of Monetary Economics*, 2020.
5. Auclert and cia. Using the Sequence-Space Jacobian to Solve and Estimate Heterogeneous-Agent Models, *Econometrica*, 2021.

GRADING

- a) A group (max 3 people) 30 minutes presentation in mid-august on a paper not seen during class.
- b) A 1h 30min standard written test (in loco).

CONTACT