Universidade de Brasília
Departamento de Economia
Pós-Graduação em Economia

Plano de Ensino

Dados de Identificação	
Disciplina:	Tópicos Especiais em Macroeconomia (macro quantitativa c/ agentes heterogêneos)
Professor:	Tomás R. Martinez tomas.martinez@unb.br https://tomasrm.github.io/teaching/quantmacro/
Carga Horária	60 horas (4 créditos)

1 Objetivos e Descrição do Curso

O curso tem dois objetivos principais: (i) familiarizar o estudante com a pesquisa de fronteira na macroeconomia com agentes heterogêneos, e (ii) proporcionar as ferramentas necessárias para solucionar esses modelos computacionalmente.

O curso será dividido em dois grandes "módulos". No primeiro, estudaremos heterogeneidade no nível da família. Utilizaremos modelos com mercados incompletos onde a distribuição de riqueza da economia é endógena, e choques econômicos individuais (renda, emprego, saúde) tem fortes implicações para o consumo das famílias/agentes. Políticas públicas como tributação, seguro desemprego, e previdência terão impactos de primeira ordem no bem-estar das famílias. Discutiremos também como a heterogeneidade de renda e riqueza das famílias interagem com a política monetária/rigidez nominal em modelos HANK (*Heterogeneous Agent New Keynesian*).

No segundo, estudaremos heterogeneidade no nível da firma. Utilizaremos modelos de *firm/industry dynamics* e de empreendedorismo (*occupational choice*) para estudar as decisões de emprego, investimento, inovação, entrada de mercado, etc, e suas implicações macroeconômicas.

Finalmente, discutiremos como levar esses modelos aos dados (em particular, no uso de métodos de inferência causal em macro), e em caso que haja demanda, métodos computacionais de solução em tempo contínuo. O conteúdo do curso é adaptável, e podemos dedicar mais ou menos tempo a um assunto dependendo do interesse dos estudantes matriculados.

2 Metodologia e Avaliação

A dinâmica do curso será a seguinte: o professor apresentará os modelos e os métodos computacionais para solucioná-los. Os estudantes entregarão duas listas de exercícios onde irão resolver os modelos básicos no computador (em uma linguagem de programação da sua escolha), farão uma apresentação de um artigo a escolha, e ao final do curso entregarão um projeto de pesquisa.[1]

1. Duas listas de Exercícios (em grupo) (40%)
2. Apresentação (individual) (20%)

[1] Exemplos de possíveis artigos para apresentação na parte de "outras aplicações" do conteúdo programático. O estudante também pode sugerir um artigo que pode ou não ser aceito pelo professor.

3. Proposta de Pesquisa (individual ou em dupla) (40%)

O requisito mínimo para seguir o curso é ter feito um curso inicial de Macroeconomia ao nível da pós-graduação e ter noções de programação dinâmica. Como o curso requer apresentações de estudantes e do professor, a presença durante a aula será exigida e seguirá as normas da universidade.

3 Material

O curso será baseado em artigos (as leituras obrigatórias estão marcadas com *). Alguns livros podem ser úteis para determinados tópicos em métodos computacionais.

- **Ljungqvist, Lars and Thomas J. Sargent. 2004.** ***Recursive Macroeconomic Theory***: Referência básica para programação dinâmica. Tem um capítulo dedicado para o modelo de Huggett-Aiyagari.
- **Sargent, Thomas and John Stachurski. 2021.** ***QuantEcon***: Introdução open source para aprender a programar em Python e em Julia. https://quantecon.org/
- **Heer, Burkhard and Alfred Maussner. 2008.** ***Dynamic General Equilibrium Modeling***: Ótima referência para métodos aplicados a modelos de agentes heterogêneos.
- **Fehr, Hans and Fabian Kindermann. 2018.** ***Introduction to Computational Economics using Fortran***: Para os que querem se aventurar em Fortran. Útil mesmo se você programa em outra linguagem, já que os algoritmos são claros e bem explicados.

Outros livros podem ser úteis em outras aplicações: Judd (1998) é a enciclopédia básica de economia computacional. Canova (2007) é ótimo para DSGE e séries temporais. Miranda and Fackler (2002) é uma boa referência para soluções em Matlab.

4 Conteúdo Programático

1. **Heterogeneidade na Família**
   (a) Desigualdade de renda e de riqueza: O modelo de Bewley-Huggett-Aiyagari-Imrohoroglu. Aiyagari (1994)*, Guvenen (2011)*, Heathcote et al. (2009).
   (b) Desigualdade de Consumo, Renda e Riqueza durante o ciclo de vida. Storesletten et al. (2004)*, Huggett et al. (2011), Kaplan and Violante (2010).
   (c) Além do *Stationary Equilibrium*: Dinâmicas de transição e choques agregados. Krusell and Smith (1998)*, Boppart et al. (2018)*, Krueger et al. (2016), Algan et al. (2014).
   (d) Política Monetária e Rigidez nominal (Heterogeneous Agent New Keynesian). Kaplan et al. (2018)*, Kaplan and Violante (2018), Auclert et al. (2018), Auclert (2019), McKay et al. (2016).
   (e) Métodos Computacionais: Endogenous Grid Method; Discretização do processo estocástico (Tauchen & Rowenhorst); Non-stochastic simulation of the Stationary Distribution; Algoritmo de Krussel & Smith; Método de Reiter; Auclert et al. (2021); Bayer and Luetticke (2020).
   (f) **Outras Aplicações**: Consumption and Income Inequality (Krueger and Perri, 2006); Long Run Trends in Hours and Income Inequality (Heathcote et al., 2010); Social Security (Conesa and Krueger (1999), Fuster et al. (2007)); Labor and Capital Taxation (Conesa et al. (2009),Guvenen et al. (2014);); Wealth Inequality (De

Nardi and Fella (2017), Quadrini (2000)) Fiscal Policy and the Wealthy hand-to-Mouth (Kaplan and Violante, 2014); Human Capital and Education (Lochner and Monge-naranjo (2011), Abbott et al. (2019)); Family Economics (Greenwood et al. (2016), Barczyk and Kredler (2018), Voena (2015)); Progressive Taxation (Heathcote et al. (2020), Boar and Virgilu Midrigan (2020)); Risk and Income Dynamics (De Nardi et al., 2020); Consumer Default (Chatterjee et al. (2007), Livshits et al. (2007); Welfare/ Cash Transfer Policy (Low et al. (2010), Wellschmied (2021)); Volatility Shocks and Consumption over the Business Cycles (Bayer et al. (2019), McKay (2017)); Labor Market Frictions (Krusell et al. (2010), Bils et al. (2011), Nakajima (2012), (Ravn and Sterk, 2021)); Fiscal Policy and Automatic Stabilizers (Hagedorn et al. (2019), (McKay and Reis, 2016)). Open Economies (Auclert et al., 2021); Heterogeneous Porfolios (Luetticke, 2021);

2. **Heterogeneidade na Firma.**

   (a) Heterogeneidade na produtividade e *firm dynamics*. Hopenhayn (2014)*, Hopenhayn and Rogerson (1993)*, Hopenhayn (1992).

   (b) Comércio Internacional. (Melitz, 2003).

   (c) *Misallocation*. Restuccia and Rogerson (2017)*, Restuccia and Rogerson (2008)*, Hsieh and Klenow (2009).

   (d) Empreendedorismo, frições financeiras e desenvolvimento. Midrigan and Xu (2014)*, Buera et al. (2011).

   (e) Choques, Custo de Ajuste e Flutuações Agregadas. Clementi and Palazzo (2016)*, Khan and Thomas (2008), Bachmann and Bayer (2013).

   (f) Métodos Computacionais: Projection Methods; Discrete Choice; Terry (2017), Winberry (2018).

   (g) **Outras Aplicações**: Innovation and Quality Ladders (Klette and Kortum (2004), Akcigit and Kerr (2018)); Uncertainty Shocks (Bloom et al. (2018), Bloom (2009)); Monopoly and Monopsonic Power (Berger et al. (2019), Edmond et al. (2015), De Loecker et al. (2020)); Trade Liberalization (Cosar et al. (2016), Kambourov (2009)); Development and Firm Size (Poschke (2018), Bento and Restuccia (2017), Hsieh and Klenow (2014)); Informality (Ulyssea (2018), D'Erasmo and Moscoso Boedo (2012)); Start-ups and Firm Growth (Sterk et al. (2021), Sedláček and Sterk (2017)); Entrepreneurship and Inequality (Allub and Erosa, 2019); Size-dependent Policies (Guner et al. (2008), Garicano et al. (2016)), Microfinance (Buera et al., 2021); Large Firms and Granularity (Carvalho and Grassi (2019), di Giovanni and Levchenko (2012)); Firm and Employment Dynamics (Decker et al. (2014), Bachmann et al. (2020)); Consumer Capital (Gourio and Rudanko, 2014); Manager Heterogeneity (Guner et al. (2018), Akcigit et al. (2021)); Wealth Taxation (Guvenen et al., 2019); Banking Industry Dynamics (Corbae and D'Erasmo, 2021).

3. **Dados em modelos macroecônomicos: *calibration*, *estimation*, e outros tópicos.**

   (a) Conhecimento "escondido": uma discussão (honesta) sobre *calibration*, *estimation*, e *indirect inference* em modelos macro. Nakamura and Steinsson (2018)*, Canova (2007, ch. 7).

   (b) Evidência causal regional e *missing intercept problem*. Chodorow-Reich (2020), Wolf (2019), Guren et al. (2021).

4. **Resolvendo Modelos em Tempo Contínuo.**

(a) Programação Dinâmica e Incerteza em Tempo Contínuo. Stokey (2020, The Economics of Inaction).

(b) *Finite difference method.* Achdou et al. (2021)*, Ahn et al. (2017).

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