

API-120: Advanced Macroeconomics of Open Economies II, Spring 2023

Harvard Kennedy School, Harvard University

Staff --

1st Professor: Jeffrey Frankel Jeffrey_Frankel@harvard.edu
2nd Professor: Federico Sturzenegger fsturzenegger@hks.harvard.edu
Faculty Assistant: Erin Meade Erin_Meade@hks.harvard.edu

Teaching Fellow: Lina Thomas
Course Assistants: Charles Albinet, Carlos Munoz-Carcamo, & Danni Sun
Team email: mpaid.macro@gmail.com

Times --

Lectures: Mondays and Wednesdays, 1:30-2:45 pm in L-140. ^{1/}
Review Sessions: Wednesdays, 4:30-5:45 pm or 6:00-7:15 pm in W436.
Final exam: Friday, May 5, 2:00-5:00 pm.

Course Description: API-120 is “Macro II” -- the second in the two-course core sequence on Advanced Macroeconomics of Open Economies in the MPA/ID program. Topics covered in the first half of this semester include: international financial integration, exchange rate models, speculative attacks, the carry trade, portfolio choice, currency risk, default risk, and debt sustainability analysis. The second half of the course uses tools of dynamic optimization. It begins with long-term growth theory, including the Solow, Ramsey, and endogenous growth models. It then offers primers on Overlapping Generations, Real Business Cycle theory and New Keynesian models, and finishes discussing the practical workhorses of modern macro: Dynamic Stochastic General Equilibrium models and Vector Autoregressions.

Nature of the approach: The course is largely built around analytical models. Although real-world examples will appear throughout, the course will rely heavily on theoretical and econometric analysis, as is customary in economics classes. The second half of Macro II calls for a higher level of math than the first, we strongly recommend students to engage in advanced reading of the required material for this second half.

Who is expected to take the course: This course, like Advanced Macroeconomics for the Open Economy I (API 119), is a required component of the MPA / International Development sequence. In addition to MPA/ID students, one or two students who have successfully taken API 119 in the fall may be admitted by permission of instructor.

^{1/} There will be an extra lecture (Unit 3) on Friday, Jan. 27, 4:30 pm-5:45 pm. In W436.

Weekly structure of the course:

A standard week will consist of two units. Each unit will consist of:

- (i) a required reading (plus others recommended). Before each live lecture, you should complete the required reading for the new unit;
- (ii) the live lecture from the Professor;
- (iii) an asynchronous component, which will include a recorded mini-Lecture from the professor, plus one or more quizzes. Students should do the asynchronous component after the live lecture, as in API-119. Do not get behind in taking the quizzes.

The teaching Fellow (TF) will conduct a substantive review session Wednesdays, 4:30-5:45 pm or 6:00-7:15 pm, in W436.

The entire teaching team will also hold office hours. Students should make heavy use of mpaid.macro@gmail.com, sending any and all questions to it. The teaching team will monitor it frequently. The response to a student's question may be a directly e-mailed answer, a decision to dedicate somebody's office hours to the topic in question, or the arrangement of a special bilateral appointment.

Grading: 15%: 6 Problem sets
 25%: Quizzes*
 20%: Mid-term exam
 35%: Final exam
 5%: Class participation.

* Quizzes are to be taken bi-weekly, as part of each Asynchronous Module. Do not get behind in the quizzes!

Problem Set	Due date (8:30 am). No late problem sets. (We make the solutions available.)
1.	Friday, Feb. 3
2.	Friday, Feb. 17
3.	Friday, Feb. 24
	<i>[Mid-term exam, Wed., March 8, in class]</i>
4.	Friday, March 31
5.	Friday, April 14
6.	Friday, April 28
	<i>[Final exam: Friday, May 5, 2:00-5:00 pm]</i>

Please check the dates and times of the midterm and final exams. If you have a conflict, such as a plane flight time in May, do not take the course.

Use of ChatGPT is not allowed in this course.

Students must take quizzes and exams alone; no discussion with other students is allowed.

Students are responsible for knowing what is in [the Academic Code](#), including this paragraph:

"Cheating on assignments or exams, plagiarizing or misrepresenting the ideas or language of someone else as one's own, falsifying data, or any other instance of academic dishonesty violates the standards of our community, as well as the standards of the wider world of learning and affairs...If students submit work either not their own or without clear attribution to the original source, including but not limited to the Internet, they will be subject to discipline by the HKS Administrative Board, ranging from a warning to required withdrawal or expulsion from HKS."

First half of semester: Professor J. Frankel**I. INTEGRATION OF FINANCIAL MARKETS**

1. (1/23/2023) The theory of gains from intertemporal trade
Mini-lecture: Graphical analysis
2. (1/25) Do financial markets work in practice as they do in theory?
Mini-lecture: Macro-prudential policies
3. (1/27 **Extra Friday lecture**) Measuring financial integration: Interest Rate Parity
Mini-lecture: Quantity tests of financial integration

II. EXPECTATIONS AND EXCHANGE RATES

4. (1/30) With flexible goods prices
Mini-lecture: Derivation of the model with rational expectations
5. (2/1) The speculative attack model
Mini-lecture: Generations 2 & 3 of speculative attack models
6. (2/6) With sticky prices: The overshooting model
Mini-lecture: Empirical performance of exchange rate forecasts

___ PS 1 due 2/3

III. THE CARRY TRADE, RISK, & PORTFOLIO DIVERSIFICATION

7. (2/8) Forward rate bias
Mini-lecture: Introduction to the exchange risk premium and portfolio balance model
8. (2/13) Optimal portfolio diversification
Mini-lecture: The efficient frontier, as viewed by Botswana's Pula Fund
9. (2/15) Home bias, currency risk, and equity risk
Mini-lecture: The model applied to country risk

___ PS 2 due 2/17

*[February 20: Presidents' Day holiday]***IV. DEBT & EM CRISES**

10. (2/22) Debt Sustainability Analysis
Mini-lecture: Explosive debt

___ PS 3 due 2/24

11. (2/27) Sovereign Default (**Guest lecture by F. Sturzenegger, remote**)
Mini-lecture: Consequences of default
[Note: It is possible that this unit might trade places with Unit 12.]
12. (3/1) The political economy of fiscal policy
Mini-lecture: The case of Chile's fiscal institutions
[Note: It is possible that this unit might trade places with Unit 11.]
13. (3/6) EM crises: Early Warning Indicators
No Asynchronous Module
14. (3/8) *Midterm exam*

[March 11 – March 19 SPRING BREAK]

Second half of semester: Professor F. Sturzenegger

V. GROWTH THEORY

15. (3/20) Solow and cross-country income disparities
Mini-lecture: A review of differential equations and Hamiltonians I
16. (3/22) Ramsey neoclassical growth model
Mini-lecture: Thinking about cross country differences in income
17. (3/27) Endogenous growth: Factor accumulation
Mini-lecture: The Solow model with reproducible factors
18. (3/29) Endogenous growth: Models of innovation
Mini-lecture: Can innovation be faster than optimal?
19. (4/3) Overlapping Generations Models
Mini-lecture: The $r < g$ economy
20. (4/5) OLG applications: social security, the Biden fiscal expansion, bubbles and crypto
Mini-lecture: The future of crypto currencies

__ PS 4 due 3/31

IV BUSINESS CYCLE THEORY

21. (4/10) Real Business Cycles
Mini-lecture: What is calibration?

22. (4/12) New Keynesian models of fluctuations: the basics
Mini-lecture: The Lucas island model

___ PS 5 due Fri. 4/14

- 23 & 24. (4/17-4/19) New Keynesian models of fluctuations: fiscal, monetary policy and DSGE modelling

Mini Lecture: Was the US inflation caused by the Russian invasion of Ukraine?

25. (4/24) Vector Autoregression (VAR)
Mini-lecture: Estimating a DSGE.

V. DOING POLICY

26. (4/26) Doing Policy: A Personal Conversation

___ PS 6 due 4/28

Final exam: Friday, May 5, 2:00-5:00 pm.

Readings

* = recommended

** = required reading

*** = required strongly to read *before* lecture. You may be called upon.

Readings for first half of semester (Prof. Frankel)

The textbooks are the same as for API-119:

- (i) *World Trade & Payments* (WTP), by R.Caves, J.Frankel, and R.Jones (10th edition, Addison Wesley, 2007) is available via the [Coop](#); or at the professor's [Publications](#) page. Also via chapter links below, as are other readings.
- (ii) *An Easy Guide to Advanced Macroeconomics*, by Filipe Campante, Federico Sturzenegger and Andres Velasco 2021 (LSE Press) is now [available online](#) and should also be available at the Canvas course page and at the [Coop](#).

I. INTEGRATION OF FINANCIAL MARKETS

1. The theory of gains from intertemporal trade

World Trade and Payments, 10th edition, [Chapter 21.5](#).

M. Obstfeld & K. Rogoff, 1996, *Foundations of International Macroeconomics*, Part 1.

2. The Lucas Paradox and other imperfections in financial markets

Carmen Reinhart and Kenneth Rogoff, 2004, "[Serial Default And The 'Paradox' Of Rich-To-Poor Capital Flows](#)," *American Economic Review*, vol. 94, no.2, May, 53-58. ***

Eswar Prasad, Raghuraj Rajan, and Arvind Subramanian, 2007, "[The Paradox of Capital](#)," *Finance & Development*, (IMF), March, 44, no.1, 10-13. *

Robert Lucas, 1990, "[Why Doesn't Capital Flow from Rich to Poor Countries?](#)" *American Economic Review* 80, no. 2: 92–96.

Laura Alfaro, Sebnem Kalemli-Ozcan, and Vadym Volosovych, 2008, "[Why Doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation](#)," *Rev.Ec.& Stat.*, **90, 2, 347-68**. [NBER WP 11901](#).

Mark Aguiar and Gita Gopinath, 2007, "[Emerging Market Business Cycles: The Cycle is the Trend](#)," *Journal of Political Economy* 115, 1, February.

3. Interest Rate Parity & other tests of financial integration

WTP, Chapters [21.4](#), [27.1](#). ***

The International Monetary Fund, 2012, "[The Liberalization and Management of Capital Flows: An Institutional View](#)." November.

S. Avdjiev, W. Du, C. Koch, and H.S. Shin, 2019, "[The Dollar, Bank Leverage and Deviations from Covered Interest Parity](#)," *American Economic Review: Insights*, **1, no. 2, 193-208**.

II. EXPECTATIONS & EXCHANGE RATE DETERMINATION

4. The monetary model with flexible prices

WTP, 10th edition, [Chapter 27.2-27.3](#) and [Supplement to Ch. 27, S51-55](#) ***

Michael Mussa, 1976, "The Exchange Rate, the Balance of Payments, and Monetary and Fiscal Policy under a Regime of Controlled Floating," *Scandinavian J. of Econ.* 78, May, 229-48.

Robert Lucas, 1982, "[Interest Rates and Currency Prices in a Two-country World](#)," *Journal of Monetary Economics* 10, 3, 335-359.

"[One-way baht: For 15 years, 2 currencies have outperformed all others](#)," *Economist*, Dec.7, 2019. **

5. Speculative attack models

WTP, 10th edition, [Ch. 24.3](#) ***

Roberto Chang and Andres Velasco, 2000, "Liquidity Crises in Emerging Markets: Theory and Policy," in *NBER Macroeconomics Annual* (MIT Press, Cambridge).

6. With sticky prices: the overshooting model

WTP, [Chapter 27.4-27.6](#). ***

Rudiger Dornbusch, 1976, "[Expectations & Exchange Rate Dynamics](#)" *JPE*, 84, 1161-76. **

Kenneth Rogoff, 2002, "[Dornbusch's Overshooting Model After 25 Years](#)," The Mundell-Fleming Lecture, *IMF Staff Papers* 49. *

YW Cheung, Menzie Chinn, A.Garcia Pascual, and Yi Zhang, 2019, "[Exchange Rate Prediction Redux: New Models, New Data, New Currencies](#)," *J. Intl. Money and Finance*, Vol. 95, July, pp.332-362. *

III. THE CARRY TRADE, RISK, PORTFOLIO DIVERSIFICATION

7. Forward bias and the risk premium

World Trade and Payments, 10th ed., [Chapter 28.1](#) ***

Charles Engel, 2014, "[Exchange Rates and Interest Parity](#)." *Handbook of International Economics*, vol. 4, pp. 453-522.

Markus Brunnermeier, Stephan Nagel, and Lasse Pedersen, 2009, "[Carry Trades and Currency Crashes](#)," *NBER Macro Annual 2008, vol.23*, D.Acemoglu, K.Rogoff & M.Woodford, eds. NBER WP 14473.

Craig Burnside, Martin Eichenbaum, and Sergio Rebelo, 2007. "The Returns to Currency Speculation in Emerging Markets," *Am Econ Rev.*, 97(2), pp. 333-38, May. [NBER WP 12489](#).

"[The return of the carry trade: Interest-rate rises in some big emerging markets will entice foreign capital](#)," *The Economist*, July 3, 2021. **

8. Optimal portfolio diversification

World Trade and Payments, [Chapter 28.2](#) & [Supplement to Ch.28, pp. S55-S58](#). ***

Hanno Lustig & Adrien Verdelhan, 2011, "[The Cross-Section of Foreign Currency Risk Premia and Consumption Growth Risk: Reply](#)," *AER*, 101, no.7,Dec.. [NBER WP 13812](#).

"[Fear and favour: Exchange-rate shifts have helped the global economy](#)," *Economist*, Sept. 7, 2017.

9. Exchange rate risk, equity risk, and home bias

World Trade and Payments, [Chapter 28.3](#) ***

Nicolas Coeurdacier and Hélène Rey, 2013, "[Home Bias in Open Economy Financial Macroeconomics](#)," *Journal of Economic Literature*, 51 (1): 63-115.

IV. DEBT & EM CRISES

10. Debt Sustainability Analysis

WT&P, [Supplement to Ch.24, pp. S47-S48 \(DSA in continuous time\)](#). ***

FSV ([Chapter "22"](#)) 17.7, pp.273-274 (DSA in discrete time). **

"[Brazil warned of 'explosive' build-up of public debt](#)," *Financial Times*, 24 May 2016.

Klaus Regling, "[Solidarity with Greece will render its debt sustainable](#)," *FT*, Sept. 19, 2017.
"[The eurozone recovery achieves critical mass](#)," *Financial Times*, Sept. 20, 2017.
"[IMF warns eurozone that Greece needs more Greek debt relief](#)," *Fin. Times*, Aug. 1, 2018.
"[Why securing debt forgiveness for poor countries is so hard](#)" *Economist*, Oct.17, 2020. **

11. Sovereign default

Federico Sturzenegger, 2020, "Do We Need to Rethink Debt Policy in Latam?" [UNDP LAC C19 PDS No. 23](#), Nov. ***

F.Sturzenegger & Jeromin Zettelmeyer, 2007, *Debt Defaults and Lessons from a Decade of Crises* (MIT Press), [Chapters 1-3](#).

Josefin Myer, Carmen Reinhart, & Christoph Trebesch, 2019, "Sovereign Bonds since Waterloo," NBER WP No. [25543](#). [Summary in NBER Digest](#), April 2019. *

J.Bulow, C.Reinhart, K.Rogoff & C.Trebesch, 2020, "[The Debt Pandemic](#)," *Finance & Dev.*, Fall. *
"[Jamaica's tumultuous relationship with the IMF has a happy ending](#)," *The Economist*, Nov. 9, 2019.
"[Zambia was already a case study in how not to run an economy. Then came covid-19](#)," *The Economist*, May 2, 2020.

"[Transparency offers way out of Zambia debt crisis](#)," *Financial Times*, Oct. 19, 2020. *

"[Debt dilemma: Emerging countries seek action to avert crisis](#)," *Financial Times*, Dec. 20, 2020. *

"[Default option: Poor countries struggling with debt fight to get help](#)," *Economist*, March 6, 2021. *

12. The political economy of fiscal policy

CSV ([Chapter "23"](#)): 18.2, Political Economy Approach; Rules & Institutions, pp.299-302.**

J. Frankel, Carlos Végh and Guillermo Vuletin, 2013, "[On Graduation from Fiscal Procyclicality](#)," *J. Development Econ.* 100, no.1, Jan., pp.32-47. [NBER WP 17619](#). Summary: "[Fiscal Policy in Developing Countries: Escape from Procyclicality](#)," *VoxEU*, June 2011. **

"[The unexpected lesson of Ghana's 17th IMF bailout](#)," *The Economist*, August 11, 2022. **

13. EM crises: Early Warning indicators

WTP, [Ch. 24.1-24.2, 24.4-24.5 & 24.8](#) **

J.Frankel and G.Saravelos, 2012, "[Are Leading Indicators Useful for Assessing Country Vulnerability? Evidence from the 2008-09 Global Financial Crisis](#)," in *J. International Economics*. 87, no.2, July, 216-231; [NBER WP 16047](#). [HKS RWP 11-024](#). Summary at [VoxEU](#), 2010 *

Barry Eichengreen, Poonam Gupta & Rishabh Choudhary, 2021, "[The Taper This Time](#)," NCAER WP No.131, November.

"[Economic epidemiology](#)," *The Economist*, June 16, 2012.

"[Financial indulgence](#)," *The Economist*, April 5, 2014.

"[Emerging markets debt: The well runs dry](#)," *The Economist*, March 5, 2016.

"[Hot and Sour: What Asia learned from its financial crisis 20 years ago](#)," *The Economist*, July 1, 2017.

"[The fragile four: Which emerging markets are most exposed to a Treasury tantrum?](#)" *The Economist*, March 6, 2021.

"[The 53 fragile emerging market economies](#)," *The Economist*, July 20, 2022. **

14. Midterm exam

Readings for second half of semester (Prof. Sturzenegger)

Textbooks:

An Easy Guide to Advanced Macroeconomics, by Filipe Campante, Federico Sturzenegger and Andres Velasco 2021 (LSE Press) is now [available online](#) for free and should also be available at the Canvas course page and at the [Coop](#).

Advanced Macroeconomics, by Romer, David 2019, (Mc Graw Hill), Fifth Edition.

Blanchard, O. J., & Fischer, S. (1989) *Lectures on Macroeconomics*. MIT press.

Recursive Macroeconomic Theory, by Ljungqvist, L. and Sargent, T. 2018, The MIT Press. (Note: Ph.D in economics level)

15. Solow and cross-country income disparities

CSV, Chapter 2 ***

Solow, R. M. (1956). "A Contribution to the Theory of Economic Growth". *The Quarterly Journal of Economics*, Vol. 70 (1), pp. 65-94.

Blanchard, O. J., & Fischer, S. (1989) *Lectures on Macroeconomics*. MIT press. Chapter 2.

Lucas, R. (2000) "Some Macroeconomics for the 21st Century", *Journal of Economic Perspectives*, Vol 14, No. 1, Winter, pp. 159-168.

16. Ramsey's Neoclassical Growth Model

CSV, Chapter 3 ***

Ramsey F. P. (1928) "A mathematical theory of savings" *Economic Journal*, Vol 37, 47-61.

Blanchard, O. J., & Fischer, S. (1989) *Lectures on Macroeconomics*. MIT press. Chapter 2.

CSV, Chapter 4 (if you want to see the model applied to the open economy you saw with Prof. Frankel)

CSV, 18.3 (if you want to see an application to the capital-labor taxation debate. Note: very difficult)

17. Endogenous Growth: Factor Accumulation

CSV, Chapters 5.1-5.4***

Lucas, R. (1988) On the Mechanics of Economic Development. *Journal of Monetary Economics*, Vol. 22 (1), pp. 3-42.

Romer, P. M. (1990) Endogenous technological change. *Journal of Political Economy*, Vol. 98, pp. 71-102.

18. Endogenous Growth: Models of Innovation

CSV, Chapter 6. ***

AlphaGo The Movie, (2017), Youtube***.

Grossman, G. M. & Helpman, E. (1991) *Innovation and Growth in the Global Economy*. MIT press.

Aghion, P., and Howitt P. (1992) "A Model of Growth Through Creative Destruction." *Econometrica*, Vol. 60 (2), pp. 323-351.

Aghion, P. and Howitt, P. (2008) *The Economics of Growth*, MIT Press.

Kremer, M. (1993) "Population Growth and Technological Change: One million BC to 1990". *The Quarterly Journal of Economics*, 108 (3), pp. 681-716.

Piketty, T. (2013) *Capital in the XXIst Century*, Harvard University Press.

Gordon, R. (2017) *The Rise and Fall of American Growth*, Princeton University Press.

Gordon, R. (2018) "Why Has Economic Growth Slowed When Innovation Appears to be Accelerating?" NBER Working Paper No. 24554.

19 OLG Models

CSV, Chapter 8. ***

Diamond, P. (1965) "National Debt in a Neoclassical Growth Model". *The American Economic Review*, Vol. 55 (5), pp. 1126-1150.

Blanchard, O. (1985) "Debt, Deficits, and Finite Horizons". *Journal of Political Economy*, Vol. 93 (2), pp. 223-247.

Blanchard, O. (2019) "Public Debt and Low Interest Rates" *American Economic Review*, Vol. 109 (4), pp. 1197-1229.

20. OLG applications: social security, the Biden fiscal expansion, bubbles and crypto

CSV, Chapter 9, 22.3***

CSV 22.3.1 and 22.3.3

Blanchard, O. J., & Fischer, S. (1989) *Lectures on Macroeconomics*. MIT press. Chapter 5.1 and 5.2.

Tirole, Jean (1985) "Asset Bubbles and Overlapping Generations" *Econometrica* 53 (Dec) 1499-1528

Barro, Robert (2022) r minus g , *Review of Economic Dynamics*, October.

21. Real Business Cycles

CSV, Chapter 14. ***

Prescott, E. (1986) "Theory Ahead of Business Cycle Measurement", *Federal Reserve Bank of Minneapolis Quarterly Review*, pp. 9-22.

Mendoza, E. (1991) "Real Business Cycles in a Small-Open Economy," *American Economic Review*, Vol. 81, pp. 797–818.

Rebelo, S. (2005) "Real Business Cycle Models: Past, Present and Future" *The Scandinavian Journal of Economics*, Vol. 107 (2), June, pp. 217-238.

Uribe M. and Schmitt-Grohe, S. (2017) *Open Economy Macroeconomics*, Princeton University Press., Caps. 1 and 4.

Eichenbaum, M., Rebelo, S. and Trabandt M. (2021) *The Macroeconomics of Epidemics*, *The Review of Financial Studies*, Vol 34 (11) November.

22. New Keynesian Models of Fluctuations: the basics

CSV, Chapter 15.1-15-3.***

Romer, D (2019) *Advanced Macroeconomics*, Chapter 7 (Same in 4th and 5th ed)

Lucas, R. (1973), "Some International Evidence on Output-Inflation Tradeoffs", *The American Economic Review*, Vol 63 (3), pp. 326-334.

Calvo, G., (1983) "Staggered Prices in a Utility-Maximizing Framework," *Journal of Monetary Economics*, Vol. 12 (3), pp. 383-98.

Galí, J. (2008) *Monetary Policy, Inflation and the Business Cycle*, Princeton University Press. Ch. 2 to 4 and 6.

23 & 24. New Keynesian Models of Fluctuations: fiscal and monetary policies and passthrough

CSV, Chapter 15.4, 17.4, 18.2***

Soylu, Can (2021), *Simulating a DSGE Model Video Tutorial*

<https://zenodo.org/record/5572649#.Y3U20exBy3I>***

Collar, F., 2009, "Stochastic simulations with DYNARE: A practical guide,"

<http://www.dynare.org/documentation-and-support/tutorial>

Christiano, L., Trabandt, M. and Walentin, K. (2011) "DSGE Models for Monetary Policy Analysis", in: B. Friedman & M. Woodford (ed.), *Handbook of Monetary Economics*, vol. 3, Ch. 7, pp. 285-36.

Christiano, L., M. Eichenbaum and M. Trabandt (2018) "On DSGE Models." *Journal of Economic Perspectives*, Vol. 32 (3), pp. 113-40, Summer.

Gali, J. (2020) "Monetary Policy and Bubbles in a New Keynesian Model with Overlapping Generations", Mimeo. CREI.

25. (4/27) Vector Autoregression (VAR)

CVS and der Meguerditchian (2022) Estimating VARs & SVARs

<https://zenodo.org/record/6908013#.Y3UqK-xBy3I>***

Christiano, L. J. (2012). [Christopher A. Sims and vector autoregressions](#). *The Scandinavian Journal of Economics*, 114(4), 1082-1104.

Stock, J. H., & Watson, M. W. (2001). [Vector autoregressions](#). *Journal of Economic Perspectives*, 15(4), 101-115.

26. (4/29) **Doing Policy: a Personal Conversation**

Sturzenegger, F. (2019) "Macri's Macro: The Elusive path to Stability and Growth", *Brookings Papers on Economic Activity*, Spring, pp. 339-411.