

CRAIG A. CHIKIS
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Permanent Address

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Mailing Address (valid until 06/01/2021)

4858 Battery Lane, Apt. 216
Bethesda, M.D., 20814

Personal Information:

Birthdate: July 26, 1997
Pronouns: He/Him/His
U.S. citizen

Undergraduate Studies:

Majors: Chemical and Biomolecular Engineering and Economics
Minor: Mathematics
Johns Hopkins University
General and Departmental Honors; Tau Beta Pi
2019

Professional Activities:

Board of Governors of the Federal Reserve System
Senior Research Assistant Macro-financial Analysis Section, Monetary Affairs Division
Washington, D.C.
June 2019-present

Unilever
R&D Intern
Englewood Cliffs, N.J.
June 2017-August 2018

Johns Hopkins University
Undergraduate TA/Student-athlete tutor/PILOT Leader (rough equivalence: Undergraduate TA)
Baltimore, M.D.
September 2016-May 2019

Professor Laurence Ball
Research Assistant
Baltimore, M.D.
November 2017-May 2019

Research Interests:

Primary field: Macroeconomics

Secondary fields: Macro-labor, IO, growth, innovation, and monetary policy

Teaching Experience:

Fall 2016 Elements of Macroeconomics, Johns Hopkins University, student-athlete tutor and undergraduate TA

Fall 2017	<u>Monetary Analysis</u> , Johns Hopkins University, student-athlete tutor and undergraduate TA <u>Elements of Macroeconomics</u> , Johns Hopkins University, undergraduate TA <u>General Physics for Physical Sciences Majors I</u> , Johns Hopkins University, undergraduate TA
Spring 2018	<u>Introductory Chemistry I</u> , Johns Hopkins University, undergraduate TA <u>Macroeconomic Theory</u> , Johns Hopkins University, student-athlete tutor <u>International Monetary Economics</u> , Johns Hopkins University, student-athlete tutor and undergraduate TA <u>General Physics for Physical Sciences Majors II</u> , Johns Hopkins University, undergraduate TA
Fall 2018	<u>Introductory Chemistry II</u> , Johns Hopkins University, undergraduate TA <u>Elements of Macroeconomics</u> , Johns Hopkins University, undergraduate TA <u>International Trade</u> , Johns Hopkins University, student-athlete tutor <u>Macroeconomic Theory</u> , Johns Hopkins University, Student-athlete tutor <u>General Physics for Physical Sciences Majors I</u> , Johns Hopkins University, undergraduate TA
Spring 2019	<u>Macroeconomic Theory</u> , Johns Hopkins University, Student-athlete tutor and undergraduate TA

Honors:

September 2015-May 2019	Dean's List
Spring 2018	Tau Beta Pi
Spring 2019	Graduated with General and Departmental Honors
Spring 2020	Division Director's Award for Excellence

Research Papers:

"Interest Rates, Innovation, and Creative Destruction" (with Jonathan Goldberg and David López-Salido)

- Invited to be presented at the macro seminars of the Federal Reserve banks of NY, Chicago and San Francisco and Einaudi
- Accepted for the FR System Macro Conference (Discussant: Martí Mestieri)

Do very low interest rates harm innovation, long-run growth, and competition? We address this question theoretically and quantitatively using a framework that nests canonical Schumpeterian models. Our model provides a good fit to the cross section of markups, profit volatility, R&D, and innovation output, as well as entrants' employment share and contribution to aggregate innovation. A lower interest rate boosts growth with the markup distribution little changed. These results cast doubt on recent arguments pointing to interest rates as the driver of low growth and rising markups over the past two decades. To be sure, imposing severe (and counterfactual) restrictions on creative destruction leads to a growth "speed limit" at low interest rates, with growth declining as the interest rate falls. However, this decline in growth reverses under modest departures from these severe restrictions or if patent policy is adjusted optimally. The growth "speed limit" economy offers policymakers a free lunch: weakening patent protection boosts growth and reduces markup-related production distortions. As a theoretical contribution, we reach these conclusions by developing a novel methodology that maps the cross section of partial equilibrium effects on R&D into the general equilibrium effect on growth. This mapping – the *innovation multiplier* – captures dampening or amplification from partial equilibrium to general equilibrium through firms' strategic and labor-market interactions.

"Optimal Schumpeterian R&D Subsidies with Declining Real Rates"

What is the optimal level of research and development (R&D) subsidies for innovative firms? What types of firms should be subsidized and how should a social planner attempt to target these firms? How do optimal subsidies vary with key features of the economic environment? Finally, what is the interaction between R&D subsidies and other policies (such as patent policies and, more broadly, intellectual property rights (IPR))? In this paper, I leverage a realistically calibrated and flexibly parameterized Schumpeterian endogenous growth model to answer these questions. Crucially, I find that the nature of optimal R&D subsidies is highly dependent on the speed at which

innovating entrants and market laggards can catch up to market leaders. I use the methods developed by Goldberg, López-Salido, and Chikis to unpack this and other results. The optimal R&D policy is to positively subsidize innovation by laggards and negatively subsidize (or tax) innovation by entrants. Subsidies that encourage innovation by entrants harm welfare because the endogenous increase in creative destruction reduces the incentive to become a market leader via a “trickle down” effect (Acemolgu and Akcigity (2012)). In contrast, a useful cross-section of innovative laggards “opt-in” to subsidies; industries with high levels of competition see increased innovation, causing an increase in welfare via a “composition” effect. Subsidies provided to technological laggards resemble state-dependent IPR – firms in industries with differing levels of competition access subsidies in a state-dependent manner. Finally, I explore the implications of allowing the social planner to set subsidy and IPR policy jointly and find these policies act additively, though via different mechanisms.