

## **Personal, Background, and Future Goals Statement**

I first witnessed the impact of economic forces on communities while growing up in post-recession Chicago. From the foreclosed homes that dotted our neighborhood to the layoffs of family members and neighbors, even as a child it was impossible not to start asking questions about what drove those trends. As a research assistant at the Board of Governors of the Federal Reserve, I have seen how empirical analysis and economic models can answer those questions. Now, inspired by my coursework, my experiences working on economic research, and my personal experiences living in Chicago and Washington, D.C., I aim to become a research economist in applied microeconomics with a special interest in urban economics and housing.

### **Intellectual Merit**

I have been a research assistant (RA) at the Board of Governors of the Federal Reserve in the division of Research and Statistics since June 2021. I work in a section charged with coordinating the Fed staff's view of economic growth, including consumer spending, business investment, and housing. In addition to my policy work, I work closely with Board economists on state-of-the-art economic research to tackle issues related to household finance and monetary policy. Now in my final year at the Board, I am an important contributor to two research projects I will continue through the end of my tenure.

The first project is with Board economist Patrick Donnelly Moran. We measure the effect of home equity loans (HE loans) on mortgage delinquencies and interest rates using the legalization of HE loans in Texas in 1998. As a coauthor on this project, I have taken a leading role in developing the econometric methodology and interpreting the results from that analysis. I write, maintain, and interpret the statistical methods used in the paper, including a difference-in-differences estimator and synthetic control methods. I have seen what trial-and-error looks like regarding model selection; gotten more practice working with large datasets after applying for and using both Equifax Consumer Credit Panel data and McDash mortgage data; and learned how to work collaboratively with a coauthor.

The second project (with my supervisor, Andrew Paciorek, and professors Benjamin Keys and Will Dobbie) uses new sources of data and techniques to examine how credit scores are used in the residential mortgage market, with a particular focus on the implications for racial and ethnic minorities. I've been intrigued by the mortgage market since undergrad due to its pivotal role in wealth-building and its well-known relationship with inequality, particularly because of discrimination (e.g., redlining). The results of the project show that lenders have been increasingly reliant on credit score thresholds, which incompletely measure default risk across groups. Low-income and minority applicants are disproportionately impacted by this trend, leading to more "seemingly random" loan decisions for these applicants over time. These two projects, together with my previous background, have cemented my desire to earn a Ph.D. in economics and to pursue a career in research.

Beyond working on academic research, I have also contributed to important economic and monetary policy products at the Fed. My first-year position involved working with a series of senior economists to coordinate the large and complex forecasting apparatus at the Fed. This high-stakes role involved communicating with the division director and other division heads at the Fed, and required great skill at time management, communication, and precision. Indeed, this position is so intensive it is only a one-year position. After that year, I rotated into the housing RA position. In this role, I support the economists working on understanding developments in the housing market and the nonresidential construction sector. A major achievement during this time was working with an economist in my section, Eirik Brandsaas, to create DuBoisPlots.jl, a data visualization package in Julia which creates charts in the style of W. E. B. DuBois's 1900 Paris Exposition figures. I went on to present the package at JuliaCon 2022 [1]. Capping off my time as the housing RA, I co-authored a public research note with Brandsaas, Daniel Garcia Molina, and Joseph Nichols [2]. In the note, we explain that the post-pandemic decline in nonresidential structures spending is misleading, and that actual spending is likely stronger than measured.

Prior to my research experiences at the Federal Reserve, I wrote two in-depth papers for upper-level economics courses. The first paper was for my senior-year course on machine learning in economics. I leveraged public mortgage data to measure racial discrimination in mortgage lending using machine-learning methods. I found the process both academically intriguing and personally fulfilling – not only was I engaging with interesting literature on mortgage discrimination, but I was also working on a topic I care about deeply having grown up in an historically segregated city. The second paper focused on the effects of the 2008 Medicaid expansion in Oregon for Professor Eun Yi Chung. The paper measures the effect of health insurance access on healthcare outcomes, finding that insurance coverage improves long-term health and increases the likelihood of consistent medical care. Through the process of writing this paper, I learned about quantitative policy analysis and causal inference using a randomized experiment. These experiences were my first introduction to independent economic research and moved me to pursue research professionally.

As for my training in economics and mathematics, I graduated cum laude from the University of Illinois at Urbana-Champaign (UIUC) with degrees in Econometrics & Quantitative Economics (B.S.) and Political Science (B.A.). My coursework included multivariable calculus, linear algebra, micro- and macroeconomic theory, and multiple econometrics and statistics classes. I particularly enjoyed my intermediate macroeconomics course, which I went on to staff as a teaching assistant the year after I took it. As I gained more control over my course load as a junior and senior, I enrolled myself in courses like the econometrics of policy analysis and applied machine learning in economics. I have also taken a graduate-level course in real analysis at Johns Hopkins University while working full time. These classes equipped me with the tools to evaluate applied research questions and sparked my interest in consumer finance and housing.

### **Broader Impacts**

I believe that expanding the academic literature is just one objective of good economic research. The other equally vital objective is a clear policy directive, an avenue for new scientific findings to improve the world around us. I am passionate about urban economics because of its potential to contribute to good public policy. As someone who values public service and advocacy, I believe that economics is the key to improving the quality of lives and communities. These values have informed and are reflected in my career path to date, my volunteer work, and future research plans.

Since beginning my work as a research assistant at the Fed, I have had the opportunity to learn from top-tier scholars as they presented their cutting-edge applied microeconomics papers at seminars every day. Two papers stuck with me because the authors connected their research to real policy solutions. Just weeks into my time at the Fed, I saw Board economists Daniel Ringo and Neil Bhutta present their paper discussing automated underwriting systems (AUS) [3]. They found that what had been thought to be race-blind systems were instead approving white mortgage applicants at a higher rate than minority applicants. Bhutta and his colleagues' results suggest the need for an improved underwriting system. Later, I was inspired by Professor Erik Mayer's paper on minority loan officers, which found minority applicants who are assessed by minority loan officers are more likely to be approved for a loan, while still having lower default rates than those assessed by white loan officers [4]. The results point to a need for more minority representation in the pool of loan officers to realize equitable lending decisions. Much like the economists who wrote these two papers, I aim not only to contribute to the field of economics, but also to ensure that my research itself contributes actively to economic policy solutions.

Aside from my research, I am committed to public service through my volunteer efforts. Mentorship is a crucial tool for professional development but is often missing at the high-school level, particularly in under-resourced communities. I volunteer with College Bound D.C., an organization which pairs college graduates with current D.C. public high school students. I have mentored and tutored a high school student since I moved to the city and worked with her through her college application process and more. I continue to work with her as she enters her freshman year of college this year. Our longstanding relationship has deepened my appreciation for mentorship as I've seen how important it is for students

from marginalized backgrounds. As a graduate of public schools, I know how crucial volunteer mentorship groups like this are for exposing high schoolers to different career tracks.

I have also sought to be of service as a mentor to younger students pursuing economics degrees, particularly from diverse backgrounds. During my first year at the Fed, I volunteered as a TA for Econ 181, a class staffed by Federal Reserve employees at Howard University. The class taught students about the economic research process and R programming. I also volunteered as a presenter with Fed Ed, a program in which Federal Reserve RAs give presentations on monetary policy, financial literacy, and the field of economics to public high school students across the country.

## Future Plans

I care about mentorship, advocacy, and public service because I grew up seeing the stark impacts of economic policy. As a public high school student in Chicago, my daily train ride to school began in my largely white neighborhood on the North side and brought me to the Near West side, an area marred by historical displacement and disenfranchisement. This unjust juxtaposition, augmented by the fact that my magnet school drew students from many different backgrounds, lit a fire in me. I started what became a lifelong habit of getting involved in my community and city, from attending protests demanding an elected school board to working on political campaigns as an intern. Throughout high school and college, I found that I was passionate about learning why some policies are more effective than others. Economics allowed me to bridge my dedication to my communities and my academic enthusiasm for rigorously measuring the effects of policies. I hope to continue building on this connection as an economist.

My professional goal is to help develop urban and housing policy as an economist either at a university or a government agency. I hope to do research on a range of topics that shape urban settings. My research proposal for the National Science Foundation's Graduate Research Fellowship Program is the first stage of my larger graduate school research agenda. After completing this first stage, I aim to measure the effects of public transportation on household welfare more broadly, incorporating metrics like homeownership, spatial mobility, and banking access. Research on topics like this is crucial for urban planners and city officials to make informed decisions about resource allocation. I hope to contribute to and lead research projects that create policy solutions for a more equitable future.

While I was working on DuBoisPlots.jl with Eirik Brandsaas, I spent some time learning about W. E. B. DuBois as a researcher and social scientist. In his 1903 book *The Souls of Black Folk*, DuBois wrote, “The function of the university...is, above all, to be the organ of that fine adjustment between real life and the growing knowledge of life, an adjustment which forms the secret of civilization.” This is my philosophy of academia – its purpose is to expand our information set about the world for the purpose of improving the world. I want to become an economist not only to contribute to the growing knowledge of the field, but to connect it to real life.

- [1] Brandsaas, Eirik and Kyra Sadovi (2022). DuBoisPlots.jl Julia Package. [Presented to JuliaCon June 2022](#). [2] Brandsaas, Eirik, Daniel Garcia, Joseph Nichols, and Kyra Sadovi (2023). “Nonresidential construction spending is likely not as weak as it seems,” FEDS Notes. Washington: Board of Governors of the Federal Reserve System, March 11, 2023, <https://doi.org/10.17016/2380-7172.3283>. [3] Bhutta, Neil and Hizmo, Aurel and Ringo, Daniel, How Much Does Racial Bias Affect Mortgage Lending? Evidence from Human and Algorithmic Credit Decisions (August 2, 2022). Available at SSRN: <https://ssrn.com/abstract=3887663> or <http://dx.doi.org/10.2139/ssrn.3887663>. [4] Frame, W. Scott and Huang, Ruidi and Mayer, Erik J. and Sunderam, Adi, The Impact of Minority Representation at Mortgage Lenders (October 19, 2021). SMU Cox School of Business Research Paper No. 22-08, Available at SSRN: <https://ssrn.com/abstract=4054761> or <http://dx.doi.org/10.2139/ssrn.4054761>