

## RESEARCH STATEMENT: EXECUTIVE SUMMARY

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**Overview of my research.** Risk is an integral part of the human experience. In big and small decisions, in our personal and professional lives, routinely and sporadically, we are exposed to different levels and types of risk. Understanding risk and how it affects our decisions and lives is of paramount importance. It also is one of the fundamental objectives of research in economics, research that my career is devoted to. My goal is to answer fundamental questions related to this topic: What are the variables driving risks in the economy? How can we estimate these variables and quantify their impacts? How do economic risks interact with individuals' decisions? To tackle these questions I have been working on two streams of research: (i) econometrics and asset pricing and (ii) behavioral and experimental economics.

I have devoted most of my career to understanding the risks driving assets' prices. These risks are of significant importance for theoretical and applied economists given that in a decentralized economy prices are the fundamental signals reflecting the outcomes of human economic interactions. The risks I study are also of crucial value for practitioners. For example, the multi-billion-dollar hedge fund industry is built on providing investors with capabilities to hedge specific economic risks. An incorrect picture of those risks can lead to the misallocation of managed capital, which entails large monetary losses to investors and the economy as a whole.

Undoubtedly, the existence of risks that are out of human control affect people's behavior (e.g., the existence of viruses capable of generating a pandemic). However, human behavior is also bound to generate new risks (e.g., different policies and reactions to the realization of a pandemic have different economic consequences). With either type of risk, there are questions related to human behavior that cannot be answered with observed data, but a carefully designed experiment can be used to estimate (causal) effects. To better answer these types of questions and broaden my understanding of risk, I have recently delved into the field of behavioral and experimental economics.

In my papers, I have developed new econometric methods and applied state-of-the-art existing tools. To answer my research questions I rely on *big data* methods and recently, I have also developed a novel experimental method called the "mobile experiment," bringing the 21st century's technology to economics research.

In addition to making my research known in the academic realm (I have presented my work in more than 60 conferences and seminars all over the world), I intend for my research to have a significant real-world impact. This has translated into having many of my results discussed in multiple media outlets, for example the Financial Times, Bloomberg, The New York Times, and CNN en Español, just to mention a few.

**Econometrics and asset pricing.** (7 published papers: 4 in A-level journals including 1 in *Econometrica*. 3 in the Financial Times Top 50 journals' list. 3 working papers). My research in this area focuses on developing new methods and applying existing ones to better understand the risks that drive asset returns. My econometrics research contributes to the literature on panel data analysis. Within this literature, an interesting, novel, and active area of research is that of factor models of large dimensions. These models are very popular in the finance and macroeconomics literature since they allow the researcher to summarize potentially complicated relationships using a small number of key variables. When working with factor models there are two fundamental questions that need to be answered: (i) how many factors exist? and (ii) what are the factors? My econometrics work is a methodological contribution for answering both fundamental questions.

My work in asset pricing applies the methodology developed in my econometric research to identify the number of risk factors driving asset returns, and to develop a tangible characterization of these factors. This is a fundamental question of theoretical and practical value in the financial economics literature for which we still do not have a definite answer. For this purpose, I have been developing and applying tools that emphasize a more rigorous analysis of the data and testing of the models proposed in the empirical asset pricing literature. In my papers I have provided a tentative answer to the question of how many factors there are and, within the multitude of factors proposed in the literature, which ones are relevant. I have also used asset pricing techniques to explore phenomena in the health economics realm, where I address the problem of increasing US health care expenditures, which is an issue of national concern and a continuing challenge for researchers and policy makers.

**Behavioral and experimental economics.** (1 published paper and 4 working papers). My work in this area is my newest venture and is a collaboration with Konrad Grabiszewski (formerly at the University of Miami). We are advancing a creative and innovative method to perform experiments – on a global scale – to develop our understanding of human decision making and behavior. We call this method the mobile experiment: It collects data from users' interactions with a game on their mobile phones, which delivers insight into many facets of the users' decision processes. Mobile experiments allow researchers to create large, unique datasets, tailored to reveal the inner workings of individual decisions. With over [5.16 billion unique mobile phone users](#) worldwide, more and more people are moving their daily activities and interactions with others from the physical world to the digital one. As Mark Zuckerberg said in 2012, “[I do everything on my phone as a lot of people do.](#)”

This shift has only been accelerated by the COVID-19 pandemic, which has restricted physical interaction, with the potential to forever alter the way that we interact. In 2016, when Konrad and I realized that we had an opportunity to turn every mobile device into a potential lab, we knew that we were seeing into the future of experimental research and began working immediately to realize our vision.

Our first mobile experiment is called *Blues and Reds*. It has been available for free on both iOS and Android devices since September 2017 and has been downloaded more than 90,000 times from more than 190 countries. It is available in English, Spanish, traditional Chinese, and simplified Chinese.<sup>1</sup>

*Blues and Reds* has already produced data that, as of July 2020, we have used in four different research projects. All projects can be placed under the umbrella of “Comprehensive Analysis of Dynamic Decision-Making” and provide answers to fundamental questions, for example *Do people think ahead when they interact in a strategic environment? How can we objectively measure the skills needed for strategic decision making? Do individuals who are more “skilled” devote more effort to their decisions or less? Which attributes of an individual (and the problem) affect these answers?*

**Future research.** I expect to continue advancing both lines of research to foster my understanding of which risks matter for economic decision making and how human behavior is affected by (and affects) these risks. For this purpose, I continue producing papers at the intersection of econometrics and asset pricing, while I am also developing a new mobile experiment that will allow us to study risky decision making. The new mobile experiment is called *Strategize It!* and will be available to download during the fall of 2020.<sup>2</sup> My ultimate goal is twofold: (i) to answer these fundamental economic questions for the advancement of the literature and betterment of society and (ii) to propel the economic discipline as a whole to the forefront of the latest technological advances that are modifying all aspects of our interactions with the world and fellow humans.

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<sup>1</sup> For more information about Blues and Reds, including links to App Store and Google Play, you can visit the website: <http://www.bluesandreds.com>

<sup>2</sup> For more information about *Strategize It!* you can visit the website: <https://www.strategizeit.org>