

Research statement

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I'm primarily a microeconomic theorist with wide interests in applied and policy related research questions. Here I summarize my research under the three categories of theoretical, applied and policy oriented work.

1 Theoretical work

My current theoretical research has four broad strands.

1.1 Role of big tech in economic modeling

An underlying assumption in many principal agent models and its applications is that the agent has some private information and principal has the bargaining power of setting contracts. The rise of big data is upturning much of the traditional wisdom. In a line of work under the rubric of “inverse selection” (as opposed to adverse or advantageous selection), we explore the ability of the principal to statistically infer the underlying payoff relevant state better than the agent. This inverts the informational advantage once the agent is incentivized to reveal their private information (see [Brunnermeier, Lamba, and Segura-Rodriguez \[2023\]](#)). This fundamentally changes, for example, how we view models of insurance and credit disbursements, and their predictions. We show that if the principal can commit to information disclosure policies or the agent is unable to properly do Bayesian inference, then returns to the principal from inverse selection can be large. This has implications for the design of regulation to protect consumers from the ability of large sellers to use big data in setting the terms of trade.

In another line of work, I'm exploring the implications of algorithmic pricing in relation to the emergence of collusive outcomes in various industries (see [Lamba and Zhuk \[2023\]](#)). There is increasing evidence of this, both empirical and experimental, and our goal is to provide a tractable theoretical benchmark to illustrate the key forces that are leading to markups. In particular, algorithms afford temporary commitment and quickness of response, in contrast to manual pricing. To capture these, we study a repeated Bertrand

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game, and show that if the strategies of firms are restricted to be algorithms which respond quickly, then the play of the monopoly outcome is almost inevitable. Sustainance of such collusion seems outside the scope of standard antitrust laws for it does not involve any direct communication.

This broad area of developing new models or adjusting existing ones to changing market structures brought about by recent developments in Big Data, machine learning and AI is exciting for me, and I plan to keep working on this research agenda.

1.2 Dynamic pricing and dynamic mechanism design

Many economic transactions modeled in mechanism design are inherently dynamic, where information revealed today can be used to set contracts tomorrow. Public goods such as food subsidies are provided repeatedly. In a fast-changing technological landscape, spectrum auctions and buybacks are taking place repeatedly. Taxation is often dynamic and tagged with age, social security being a case in point. Wage contracts and bonuses depend on performance parameters evaluated over time. Online selling can now rely on a huge treasure trove of past buying data. To incorporate all these realities, a literature on dynamic mechanism design has burgeoned over the last decade. I have written some key papers underscoring its evolution—both on its theoretical development and its application to price discrimination, financial constraints and firm dynamics, and optimal taxation.

To give a flavor of some of this work: In [Battaglini and Lamba \[2019\]](#), we show how the standard methodology for studying static models of mechanism design—of restricting analysis to a relaxed problem that focuses only on local incentive constraints— is insufficient for a large class of dynamic mechanism design problems. A direct consequence of this observation is on the study of dynamic taxation. Recent empirical work has established that people’s wages follow a job ladder structure, and not a random walk, as assumed in almost all the papers in the public finance literature. To incorporate the job ladder structure into optimal Mirrelesian taxation requires the modeler to go beyond the standard approach because global incentive constraints bind; in [Golosov, Krasikov, and Lamba \[2023\]](#) we do precisely that and describe how tax schedules change to internalize the job ladder structure of wages. Similarly, in dynamic pricing, consumer’s values do not change frequently, and so a Poisson process may approximate such valuation processes better for which again the standard local approach fails. In [Krasikov and Lamba \[2023a\]](#), we study the dynamic pricing problem, say for booking an airline or a concert ticket, where valuations follow a Poisson process, and show how a simple set of instruments achieves the optimum.

Further, in [Krasikov and Lamba \[2021\]](#), we incorporate financial constraints into dynamism design and study its implications for firm dynamics and capital structure. In [Krasikov, Lamba, and Mettral \[2023b\]](#)), we study how predictions of dynamic contracts

and mechanisms change when the principal has a longer time horizon than the agent, as is the case in various lending contracts and government’s policy choices for citizens. In [Krasikov, Lamba, and Li \[2023a\]](#), we study dynamic contracts without transfers, when the only instrument the principal has to screen the agent is costly verification, such as in the design of foreign aid. Finally, in [Lamba \[2022\]](#), I study how greater efficiency can be sustained in the repeated version of the canonical bilateral trading problem, especially when the agents have access to an intermediary.

1.3 Robust approaches to understanding dynamic choices and games

As information arrives over time, people may take actions that seemingly go against their own past choices. How can we judge someone’s sequence of choices without knowing what they knew? A permissive criterion would allow for any sequence of choices that can be explained by the piecemeal arrival of some information. The first paper in this line of research, [de Oliveira and Lamba \[2023b\]](#), characterizes for a general decision problem, the sequences of actions which can be rationalized by such criteria. It speaks to several applications in behavioral economics such as the famed studies on why people pay upfront for the gym and don’t go or why people buy cheaper phone contracts and overuse their minutes. Our results provide a robust and general way to reject the standard model in such settings. On the other hand, assuming the validity of model for dynamic decision problems, it also allows the econometrician to partially identify preference parameters without making any assumption on information. In follow up work, we are using the methodologies developed in the first paper to study dynamic information design (see [de Oliveira and Lamba \[2023a\]](#)) and optimal stopping problems without strong assumptions on underlying information structures.

A second research agenda generalizes the scope from dynamic choices to dynamic games, where strategic interactions are also modeled. What if players know the set of the games that they may encounter in the future but not the probability with which these games may emerge. Such uncertain repeated games, studied in [Krasikov and Lamba \[2023c\]](#), require the players to be robust to all informational considerations. For instance, what is the extent of sustainable collusion or price wars when firms may not agree on the underlying market fundamentals? We need a new set of tools on how to analyze the equilibria in such games. The equilibrium concept we use is ex post perfect, which requires a subgame perfect equilibrium be played no matter the realization of stage games. This strong criterion provides a robust lower bound in predictions to whatever model of beliefs (say dynamic ambiguity) that the modeler may come with up. The set of ex post perfect equilibrium is then characterized, in the first paper for large discount factors and then in the second follow up paper for fixed discounting (see [Krasikov and Lamba \[2023b\]](#)). This line of research is ripe for further applications in relational contracting, and the study of risk sharing and

sustainable policy plans.

1.4 Role of hard information in information and mechanism design

Many markets such as housing, diamonds, and various asset backed securities feature certification. A certificate is regarded as hard information—it can be hidden, but if presented, the score on it cannot be fudged. In [Dasgupta, Krasikov, and Lamba \[2023\]](#), we study a tractable way to design such certifications layered on top of standard pricing models such as monopolistic screening or the lemons problem. Traditional mechanism design assumed that the initial allocation of (private) information is fixed and endowed thus to the agents, such as in an auction model. More recent work in information design assumes that this information can be generated endogenously (such as through platforms like Yelp) but information is still soft and can be hidden in a variety of ways. We are interested in the endogenous production of information before physical trade, but where the information produced is hard. What kind of certifications emerge in such markets? How do they vary as a function of the bargaining power of principal or agents? We completely characterizes a class of screening models, including monopolistic screening and lemons problems, with hard information. We find that the class of optimal and efficient certification is rather simple and intuitive—taking at most two thresholds. The set of tools we develop here should prove fruitful in studying specific markets, such as the optimal split between debt and equity in designing securities for financial assets.

2 Applied work

In applied work, three strands have captured my interest and time in the last few years.

2.1 Design of treasury auctions

Every week many central banks all over the world raise debt through a large auction. These are complicated multi-unit auctions where market participants submit demand schedules. In [Gupta and Lamba \[2023\]](#), we study a particularly salient time in recent monetary memory, when the Fed in the summer of 2013 signaled that it would taper off quantitative easing. This led to “taper tantrum” in many developing countries including India, where the yields on government debt spiked. The question this paper asks is what fraction of this spike can be attributed to drop in value estimate of the market and what part of it was pure uncertainty driven conservative bidding or speculation. In particular, did strategic considerations that followed a rise in market uncertainty contribute fundamentally to the drop in price (or increase in yield)? This is especially plausible since the participation in the auctions increased significantly during this time of crisis. The answer to this question provides the central bank with an understanding of how, if at all, should they intervene in

bond markets in times of deep crisis. I plan to keep building on the institutional knowledge on treasury auctions and write more research and policy related papers on this.

2.2 Economic epidemiology

Second is the work on the economic epidemiology. Covid-19 impacted all our lives in fundamental ways. While working from home, it was impossible not to think about the implications of the rising pandemic. As a theorist, I reflected on various ways of modeling the reality playing out in front of us. In [Chakrabarti, Krasikov, and Lamba \[2022\]](#), we have worked out a behavioral model of disease dynamics where the government uses instruments of lockdown and testing-tracing, and agents social distance themselves to avoid getting infected. The modeling of the three instruments simultaneously is technically challenging, and it produces a hitherto unresolved decomposition of the control in aggregate infections and deaths due to the three forces of lockdown, testing and social distancing. Calibration to the US data produces reliable parameters for efficacy of tracing-testing and individual costs from social distancing. Learning from these models, it seems that with a high degree of certainty, it may not be possible to stop a pandemic, and that the instruments studied here should be used to isolate the infected and particularly vulnerable, and buy time for the development of an effective vaccine, while trading-off the long-term harm lockdowns may cause to the economy.

2.3 Impact of agricultural subsidies on groundwater reserves

Third, I have also been trying to understand the impact of agricultural subsidies on the groundwater reserves in India. This question is close to my heart because I have seen during extensive travels in the Indian heartland the nefarious impact of government subsidies on crop choice and eventually groundwater reserves. In [Chatterjee, Lamba, and Zaveri \[2023b\]](#), we attempt to understand a part, we think an important part, of the puzzle. Using the states of Punjab and Madhya Pradesh as case studies, we show how output subsidies for rice and wheat have systematically led to a drop in groundwater reserves and rise in the number of defunct wells. This is an empirically challenging fact to establish because the change is slow and happens over decades. Understanding this problem, and then taking steps to address it is crucial for food security and the livelihoods of millions of farmers.

3 Policy oriented research and writing

In terms of policy oriented research work, I was lucky to have stints at the Office of the Chief Economic Adviser to the Government of India, where I learnt many nuances of how research and intellectual debates translate into policy. The research work on treasury auctions and ground water reserves discussed above is a direct consequence of questions

confronted during these experiences. Beyond these, I have several other research projects based on political economy and public policy issues in India.

3.1 On the structure of Indian growth and its implications for society

During my work at the Government of India, I was part of the team that wrote the yearly Economic Survey. Much of this work has been summarized and developed further in an article for the *Journal of Economic Perspectives*, [Lamba and Subramanian \[2020\]](#). In this paper we show how India did not follow the traditional structural transformation story of moving from agriculture to low-skilled manufacturing and then high-skilled manufacturing and services. It rather jumped straight from agriculture to high-skilled services as the largest component of growth. We also explore the consequences of the India growth story on its politics and society: on the regional composition of growth, on how various groups along castes and religion have fared, gender outcomes and problems of pollution.

Further, in recent work, in [Chatterjee, Lamba, and Rai \[2023a\]](#), we explore in more detail the spatial growth pattern in India. We argue that a substantial chunk of growth in India has been concentrated in certain metros and districts. While this is not an anomaly for early growers, what is an anomaly is that barring a few exceptions, the largest population of India does not live in the states and districts with the highest incomes. So people have not migrated en masse from the low growing regions to the fastest growing regions. We discuss the various reasons for this and its welfare consequences.

3.2 Breaking the mould: Reimagining India's economic future

Over the last few years, jointly with Raghuram Rajan, we've written a few op-ed pieces in the Times of India on the economic choices India has been making and its intellectual origins and implications for growth in the coming years. This culminated in a book length project, titled *Breaking the mould: Reimagining India's economic future*, that is forthcoming in December 2023 with Penguin Random House, [Rajan and Lamba \[2023\]](#).

The basic thesis of the book is that India's unique political economic journey in the twentieth century, of being a consistent democracy despite poor and developing high-skilled services, skipping the traditional structural transformation route, are connected, and that these should be treated as a feature rather than a bug for its growth prospects going forward. There are two reasons for why turning the clock and aspiring to capture the low value added segments of traditional manufacturing may not be the right strategy: First, these processes have been optimized over decades in global supply chains and India for its own internal reasons may not be well placed to be better than the existing lot. Second, even though these supply chains may be moving, a large part of value added into even manufactured products are driven by inbuilt services, whether it is at the initial design stage or the later services attached to products. Instead, India has a natural comparative

advantage in acquiring a driver's seat in the emerging opportunities from globalization in direct services such as in finance, tele-medicine, and distance learning, and from the rise of intermediate services built into final manufactured goods such as designing chips or writing code for electric cars. The book then goes onto describe what policy choices India should make to take advantage of these opportunities.

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