

# Research Statement

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I am a macroeconomist that focuses on borrowing and lending by governments, firms and households in the presence of default risk. Throughout my research, I have used tools from the sovereign debt and finance literature, as well as those from Industrial Organization and Auction Theory, in a combination of empirical and theoretical work disciplined by data. My interest in sovereign debt in particular started with the European sovereign debt crisis of the early 2010s. This event presented a paradigm shift, showing that these events were not limited to emerging markets.

So far, I would separate my work into three categories. The first, studies how governments issue debt and how alternative issuing methods affect borrowing costs, the government's borrowing and default decisions, and, ultimately, welfare. The second, studies changes in demand for sovereign debt during debt crises. The third is concerned with policy and works toward correcting inefficiencies related with lack of commitment and the time inconsistency.

## Sovereign debt auctions

**“Sovereign Debt Auctions with Strategic Interactions”** ([Alves Monteiro and Fourakis \(2023a\)](#)), my job market paper, compares how different protocols for sovereign debt auctions affect borrowing, the cost of debt and welfare, when default risk is a concern. An auction protocol is a set of rules that determines at which price winning bids are executed. That is, what is the price at which new debt is issued and what is the corresponding revenue for the government. A motivational observation is that although auctioning sovereign debt is common, there is wide variation in practices across countries, particularly between uniform and discriminatory price auctions. Moreover, there is anecdotal evidence of countries switching auction protocol during or after a crisis period. This paper argues that when default risk is a concern, the auction protocols induce different incentives on government's borrowing which in turn feedback to the prices it faces, ultimately having welfare implications. We propose a theoretical model of sovereign borrowing and default where, every period, the government runs an auction, investors submit bids and then the government decides how much to borrow. There is asymmetric information about the government's spending which induces investors to submit multiple bids at different prices. The calibrated model shows that the benefits of switching from a discriminatory price protocol to a uniform price protocol are increasing in the likelihood of default and go up to 0.6%

of permanent consumption. This result is consistent with the change in protocol observed in the data: Portugal switched from a discriminatory to a uniform price protocol in the aftermath of the sovereign debt crisis.

This new avenue of research, with the explicit modeling of an auction framework into a sovereign debt model highlights how rich the environment is. An example is our work in progress: **“Multiplicity in Discriminatory Auctions”** ([Alves Monteiro and Fourakis \(2023b\)](#)). It is known that [Eaton and Gersovitz \(1981\)](#) has a unique equilibrium. One key condition for uniqueness is the fact that new borrowing by the government pins down the risk of default: first the government decides whether to default or not, and only after, if it repays, it decides how much to borrow. At a static level, there are two canonical examples of multiplicity [Cole and Kehoe \(2000\)](#) and [Calvo \(1988\)](#). Both explore how changes in the timing assumptions in [Eaton and Gersovitz \(1981\)](#) open the door to multiplicity, through self-fulfilling crises. In [Cole and Kehoe \(2000\)](#), first the government borrows and only then decides whether or not to default. As such, for part of the state space, a failed auction triggered by expectations of future default, leads to default, which could have been prevented if the auction had been successful. In [Calvo \(1988\)](#), investors move first by proposing interest rates and high interest rates induce high default probabilities that in turn justify the high rates. At a dynamic level, long-term debt introduces multiplicity, even under [Eaton and Gersovitz \(1981\)](#) timing. This dynamic multiplicity arises from investors’ self-fulfilling beliefs regarding future borrowing. That is, the government either pursues a fiscal policy that reduces debt or one of high debt and eventual default. Both fiscal policies can be an equilibrium under the right beliefs and consistent prices.

We present a new type of static multiplicity arising from the choice of auction protocol. This new source of multiplicity does not require changes in the timing nor it requires the use of long-term debt. In fact, this multiplicity arises in a simple two period environment under discriminatory price auctions where investors “pay-as-bid”. The mechanism is reminiscent of the dynamic multiplicity introduced with long-term debt, as it relies on non-exclusivity and risk of dilution. The main difference is that it is not dynamic in the sense that it does not depend on beliefs about future fiscal policy. Instead, it depends on beliefs about fiscal policy in different states of the world, within an auction. Putting it differently, as investors “pay-as-bid”, optimality requires that bids are equal to their expectation of the value of debt, provided the bid is accepted. The expected value of debt depends on the beliefs about how much the government will borrow in that auction. Different beliefs can support multiple equilibria.

## Demand during debt crises

I believe an important next step in the literature involves data. In particular, bid level data seems to be a promising new avenue to answer questions that we could not answer otherwise. Sovereign debt is issued through auctions. The researcher typically cannot observe the demand curve for debt, and as a result uses a zero profit condition to approximate demand. With bid level data we can have a clearer picture of what demand looks like. Importantly, this can be a useful way to test current sovereign debt models. Does the workhorse of the sovereign debt literature match the demand elasticity seen in the data? This elasticity is particularly relevant as it pins down the profit of the government, a monopolist issuing debt. If not, can we think of a different model to better represent this crucial moment? This is the goal of **“Demand Elasticity in Sovereign Debt Models”**.

[Aguiar et al. \(2019\)](#) find that, in periods of potential default, the sovereign should remain passive in long-term bond markets, retiring long-term bonds as they mature but never actively issuing or buying back such bonds. Once again, we can use bid level data to estimate elasticities of demand for different securities. These are the relevant measures for the cost of issuing one more unit of a different maturity. **“Demand Elasticities and the Maturity Choice of Sovereign Debt”** uses a dataset containing individual bids on Portuguese debt auctions to estimate elasticities of demand for different securities. It then uses the sovereign debt model augmented with an auction framework to take a stand on the cross elasticities of demand across securities. With the data and the model, this paper aims at answering quantitative counterfactual questions, such as: What would have happened if, during the crisis period, the issuance policy was different, i.e., if a different maturity structure was chosen? And how much more costly would have it been?

**“A Debt Crisis with Strategic Investors: Changes in Demand and the Role of Market Power”** ([Alves Monteiro \(2022\)](#)) starts by answering whether demand for sovereign debt changes during high default risk events? it documents that aggregate bid functions are, on average, five times more elastic leading up and during the crisis. That is, on average, in order to increase the amount raised by 1%, the price would need to decrease, in percentage terms, by five times more than it had before the crisis. I then decompose the changes in demand into two components: a fundamental component, due to changes in valuation, and a strategic component, that arises from investors’ market power. I find that although the role of market power is negligible in normal times, it gets more pronounced leading up and during the crisis. Furthermore, the auc-

tion mechanism loses efficiency during that period as the government is not able to extract the full surplus from strategic investors. At their peak, inefficiency costs, measured as the fraction of the investors' surplus that the government is not able to extract, jump to 0.6% of the issued amount.

## **Policy: inefficiencies and multiplicity**

Sovereign debt markets are plagued by a number of frictions; in particular, a limited commitment to repay, limited commitment to future fiscal policies (debt dilution), lack of state contingency, and vulnerability to self-fulfilling runs. In **"Sovereign Debt Crises and Floating-Rate Bonds"** ([Aguiar et al. \(2023\)](#)), we use an analytical model to explore the role of maturity in mitigating or exacerbating the respective frictions. We show that having a coupon on a long-term bond indexed to one-period-ahead default probabilities provides all the incentive properties of one-period bonds, with the protection from the rollover risk, as in [Cole and Kehoe \(2000\)](#), of a long-term bond. In particular, the government's welfare in the floating-rate bond model in the presence of rollover risk is similar to that of a government with one-period bonds and zero chance of a rollover crisis. Moreover, the floating-rate model dominates the fixed-rate long-term bond model. Welfare gains of switching to floating-rate bonds at zero debt are roughly one percent of consumption. An important caveat is that we incorporate the hedging benefits of long-maturity bonds by having persistent income shocks; however, this omits other sources of risk that can be hedged by long-term bonds, such as shocks to risk premia or the risk-free rate. In future work we plan on incorporating shocks to the risk-free rate.

Sovereign debt dynamics are typically seen as the outcome of the decision of a sovereign – a government – on how much to borrow and whether to default. Unions of countries can change the way we think of this problem. Particularly, who chooses debt issuances and what instruments are available. **"The Case for Joint Debt"** ([Alves Monteiro and Belchior \(2023\)](#)), studies the issuance of joint bonds in a context of a union of heterogeneous countries. We use a sovereign debt model augmented with a joint bond that is issued by a supranational entity, the Commission. Joint debt is backed by the countries in the union. In return, the Commission provides contingent transfers to individual countries. We ask under what conditions it is welfare improving to issue joint bonds and whether the answer hinges on the design of such joint bonds. We take particular interest in the role of joint debt in disciplining rollover risk.

During my time at Minnesota, I had the privilege of pursuing economic research in topics that I find relevant and exciting, with the support of great advisors and co-authors. In no way I see my work limited to the projects described above. The tools have been acquired, now I look forward to new projects and new ideas, preserving current collaborations and starting new ones.

## References

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