I am a macroeconomist with research interests in finance, labor, and international economics. My current work focuses on two related research agendas. The first explores the macroeconomic implications of alleviating liquidity constraints on distressed borrowers. The second focuses on the consequences of financial shocks for the real economy when financial frictions are present. Methodologically, my research combines micro administrative or regional data with quasi-experimental strategies to uncover causal estimates linked and used to discipline a general equilibrium structural model, providing us with externally valid aggregate predictions and counterfactual policy analysis.

CURRENT RESEARCH AGENDA

1. Debt Alleviation, Liquidity Constraints and Loan Delinquency

One of the main themes of my current research investigates the impact of debt moratoria on delinquency and future loan conditions for distressed borrowers and the implications of this policy for the aggregate real economy and financial sector. Debt moratoria, which provides a temporary payment suspension on a debt instrument, is considered the less costly and most effective debt resolution practice to help liquidity-constrained borrowers (Dinerstein et al., 2024). Moratorium policies gained prominence in the wake of the 2020 pandemic. More recently, banks in Europe have initiated voluntary moratorium programs (payment holidays) for individuals experiencing financial hardship (HM Government, 2022). The two working papers I have in this area not only expand our understanding of the outer limits where liquidity-focused debt relief is effective but also provide crucial insights in the literature studying the centrality of liquidity for distressed borrowers and their high sensitivity to liquidity changes (Ganong and Noel, 2020).

1.1 *Consumer Debt Moratoria (Job Market Paper - Submitted)*

In this paper, a collaborative effort with *Bulent Guler*, *Yasin Kursat Önder*, and *Mauricio Villamizar*, we study the effectiveness of mortgage moratoria on households' consumption and delinquency behavior. Our study combines a clear-cut research design to estimate the causal effect of debt moratoria with a quantitative model of mortgage default. Our distinctive approach provides the ideal laboratory for analyzing the aggregate impact of introducing an unexpected debt payment suspension and comparing it with other debt alleviation strategies.

On the empirical front, we exploit the regulatory design for eligibility during the 2020 debt moratorium in Colombia: only mortgages with less than 60 days past due before the start of the policy were eligible for the policy. We argue that households just below and above this threshold are similar ex-ante and differ primarily in their receipt of treatment. Next, using Colombian administrative household credit data, we compare delinquent households marginally qualifying and narrowly missing the eligibility rule to estimate the effect of the policy on credit card expenditure, delinquency, and debt accumulation for mortgages and other household debt. Our results suggest that moratoria improved the economic and financial conditions of stressed households facing temporary liquidity constraints due to the COVID-19 pandemic. In particular, households receiving moratoria have a 2.1% higher credit card expenditure and a 0.98 percentage points (pp) lower mortgage delinquency probability at the end of the quarter they receive treatment. Additionally, we find that treated households reduced the likelihood of defaulting on other debt obligations: delinquency probability on short-term loans and car loans is 0.09 and 0.36 pp lower in the quarter of treatment, respectively.

Given the limitations of our discontinuity design in capturing general equilibrium (GE) effects, we complement our empirical results with a life-cycle incomplete market model based on Arslan et al. (2023). This model incorporates realistic housing tenure decisions and a banking sector providing risky mortgages to households. The structure of the model allows us to assess the policy's impact on household consumption and financial intermediaries' balance sheets. We calibrate the model targeting several aggregate moments for Colombia during 2010-2019 and use it to evaluate the effect of an aggregate productivity shock. We compare the economy's response in a benchmark case without moratoria to one where the policy is introduced after the productivity shock. Initially, we exclude GE effects to test the internal validity of the model, finding that the elasticity of household consumption to moratoria aligns with our reduced form estimates. Incorporating GE effects, we find that moratoria mitigates the negative impact of a productivity drop on households and improves financial stability: consumption and welfare decline by 7% less, and house price decline by 18% less. Though banks face short-term costs with the policy, long-term benefits arise due to lower liquidation of bank assets, as moratoria reduces the number of households prepaying their mortgage to smooth out consumption. Finally, we show that a moratoria policy without interest accrual during payment suspension improves household welfare and yields similar long-term gains for banks.

1.2 *Debt Moratoria and Macroeconomics (Working Paper-Submitted)*

In this joint work with *Yasin Kursat Önder* and *Mauricio Villamizar*, we continue our study of debt moratoria. This time, our focus is on comprehending the impact of this policy on firms' default risk and future credit conditions. Similarly to our previous paper, we focus on the 2020 Colombian Moratorium on corporate loans, with the methodological approach also integrating a credible and robust identification strategy to estimate the causal effect of the policy with a quantitative model with firm default. However, we expand the scope of analysis on both main elements of the paper. Empirically, we delve into the impact of moratoria for non-stressed firms (i.e., firms not defaulting on existing loans) using a difference-in-difference (DID) estimator that controls for firm-time and bank fixed effects to purge for unobserved demand and supply confounding factors, while keeping the Regression Discontinuity (RD) design for stressed firms based on the 60 days eligibility cutoff on delinquency days for corporate loans. In terms of our quantitative model, we introduce moratoria loans into an otherwise standard default model for firms; this feature of the model provides the necessary setup to study the aggregate effect of moratoria in cases where anticipation of the policy is present.

Regarding our empirical results, we still argue that stressed borrowers near the threshold are ex-ante similar, except that eligible borrowers receive moratoria. In the case of non-stressed firms, we find no evidence of systematic differences in observable characteristics across treatment and control groups before the policy was implemented, which is necessary for identification with the DID strategy. In this case, our data combines the Colombian credit registry for corporate loans with firm-level balance sheet data to estimate the causal impact of moratoria on default rates, credit conditions for new loans, and real firm-level outcomes. Our results show that lower default risk for borrowers under financial stress receiving moratoria improves the conditions on subsequent borrowing: within one year of being treated, stressed firms are 1.04 pp. more likely to get a new credit, which, if obtained, provides a 16.4% higher loan at a 0.35 pp. lower interest rate. The case is the opposite for non-stressed firms as moratoria seems to increase default risk increases and tighten loan conditions albeit in lesser magnitude: the probability of getting a loan is reduced by 0.08 pp., while the interest on new loans is 0.005 pp. higher. Consistent with our results on new loan conditions, stressed firms with debt moratoria improve their economic performance in terms

of higher employment, investment, and operating revenues, while no significant effect is observed on non-stressed firms with the same outcomes.

We employ our reduced form evidence to discipline a quantitative model with firm default. Our model includes two aggregate shocks impacting the economy: a liquidity shock inducing risk-averse behavior into otherwise risk-neutral banks and a productivity shock impacting firms similarly as in Mendoza and Yue (2012). Most importantly, we adjust the idea of *Sovereign Cocos* as in Hatchondo et al. (2022) to a portfolio problem for representative firms which now can borrow from banks using non-contingent (standard) loans and moratoria loans featuring payment suspension clauses that activate in response to liquidity shocks. Moratoria loans ensure low-cost financing, avoiding defaults during periods of low liquidity, but are more costly in normal times because banks are reluctant to have their receivables delayed with adverse liquidity shocks. The quantitative analysis in this paper provides two significant results regarding the aggregate effect of debt moratoria. On the one hand, even though the policy remains welfare-improving for debtors due to the lower number of firms defaulting, moratoria loans alleviate liquidity concerns, making borrowing more appealing, which in turn increases the risk of default and exacerbates the rise in interest rates during normal times. On the other hand, as a debt alleviation strategy, the short-lived nature of moratoria limits the impact of the policy on welfare, especially in the presence of persistent aggregate productivity shocks, but if moratoria is combined with debt forgiveness, borrowers experience significant welfare gains, this is because debt relief on moratorium loans mitigates the negative consequences associated with high debt levels and increased default risks generated by a temporary suspension of payments.

2. Financial Frictions, Aggregate Shocks, and the Real Economy

Since the Great Financial Crisis of 2008, a vast research agenda has focused on the role of financial frictions to understand how temporary aggregate shocks amplify business cycle fluctuations and generate a persistent decline in aggregate economic activity (Brunnermeier et al., 2012). In this second line of work, my research studies the economic consequences of financial shocks in the presence of financial frictions. Within this area, I have three working papers in an advanced stage. The first investigates the relative importance of households and firms' collateral constraints to understanding the employment consequences of a drop in real estate prices. In the second paper, I study how a firm's decisions regarding its capital structure tailor the investment response during a sovereign debt crisis. The third paper investigates the impact of reducing interest rates on guaranteed loans on firms' investment and employment.

2.1 Employment Fluctuations, Real Estate Prices, and Property Taxes (Working Paper-Submitted)

This paper examines the employment impact of declining real estate prices, focusing on two main channels: the housing wealth channel and the firm collateral channel. The housing wealth channel affects labor demand by reducing household consumption as housing prices fall, leading to lower firm sales. The firm collateral channel reduces employment demand by lowering commercial real estate values, which diminishes firms' ability to secure loans for operations. On the empirical side, this paper exploits variations in residential and commercial taxes across municipalities during the 2012 property tax reform in Italy to investigate the effects of higher property taxes on employment, consumption, and real estate prices, employing a difference-in-difference approach.

Next, we build a simple quantitative model with property taxes and financial frictions. Specifically, in our model, borrowing to households and firms is constrained by collateral requirements associated with the value of real estate assets (i.e., houses and commercial real estate). The model shows that employment responses to higher residential and commercial real estate taxes are partially captured by the household wealth and firm collateral channel, respectively. We discipline the quantitative model using our reduced form evidence and then isolate both channels affecting employment. We find that at least 80% of the employment decline following property tax increases is due to these two channels, with the firm collateral channel playing a dominant role.

2.2 Investment, Capital Structure and Default Risk (Working Paper)

This paper studies how changes in the sovereign spread affect firms' investment and the potential heterogeneous response due to different maturity and leverage decisions. We employ balance-sheet data for Italian firms and exploit predetermined variations in total and long-term debt obligations for non-financial Italian corporations. We compare firms across leverage and long-term debt share (maturity) groups to estimate the investment decline associated with sovereign spread movements during the 2010-2012 Italian debt crisis. Our empirical analysis shows that firms' investment declines during sovereign default risk episodes, and this decline is heterogeneous depending on the predetermined capital structure of firms. In particular, during the Italian debt crisis, a 100 basis point increase in the sovereign spread is associated with an investment decline of 4.02 pp. and 2.58 pp. for high-leverage high-maturity and low-leverage high-maturity firms, respectively. Moreover, we also find that during a sovereign debt crisis, higher leverage always amplifies the decline of investment, while higher maturity shields the investment for low leverage but is detrimental for firms with high leverage.

Lastly, we build a partial equilibrium firm default model to capture the main empirical results qualitatively. The model features exogenous sovereign spread shocks and firms that can default on their short and long-term debt portfolio. In the model, rollover risk and debt overhang channels determine the heterogeneous response of firms' investment to aggregate sovereign spread shocks. In particular, investment for high-leverage firms will always be more sensitive to changes in sovereign default risk due to debt overhang amplifying the negative response of investment. At the same time, at relatively lower levels of leverage, increasing maturity attenuates the negative response of investment to default risk due to lower rollover risk.

2.3 Credit Guarantees, Firm Response and Macroeconomics (Working Paper)

In this paper, jointly with *Yasin Kursat Önder*, we evaluate the effects of the 2020 Public Credit Guarantee Scheme in Belgium. Using administrative data, we leverage a policy-induced discontinuity in loan eligibility: firms with fewer than fifty employees benefited from a 25 basis point (bp) reduction in interest rates for guaranteed loans. We compare those just below the employment threshold with firms just above it. Our findings indicate that firms benefiting from the lower interest rates experienced increases in employment and investment. Locally, our results are not explained by the size of the loan received, pre-policy firm performance difference, or predetermined differences in capital structure. Interestingly, the interest rate differential did not lead to higher levels of debt accumulation; instead, these firms substituted more costly, non-guaranteed debt. Overall, our results suggest that credit guarantees enhance firms' economic performance by mitigating price-related financial frictions.

FUTURE WORK

In the coming years, I will continue two ongoing research projects related to the research agenda outlined previously. The first one studies the impact of moratoria on unemployed stressed borrowers' probability of re-hiring and future earnings conditions. Most of the existent research on debt relief and labor market outcomes focus on the effect of alternative debt relief strategies such as consumer bankruptcy protection (Dobbie and Song, 2015) and debt relief (Dobbie and Song, 2020, de Bruijn et al., 2023), which are designed to address both short-and long-run financial constraints. In this study, we explore if debt moratoria, which in principle only targets short-run liquidity constraints, can impact long-run financial constraints through changes in future labor market outcomes of financially distressed borrowers. In terms of data, I plan to combine Colombian mortgage loan data with detailed administrative employer-employee information from the Integrated Record of Contributions to Social Security (PILA) to measure labor market outcomes. Initially, the empirical strategy exploits the cutoff for eligibility to receive mortgage moratoria in 2020 in an RD design that compares future employment conditions of marginally eligible and non-eligible financially distressed borrowers fired within one year before the policy started.

In the second ongoing project, I focus on the interaction between financial frictions, labor market frictions, and sovereign default risk. In particular, we study how financial credit conditions change after an increase in sovereign spread and how this affects labor market outcomes. Previous work has found that sovereign default is associated with significant declines in domestic output (Trebesch and Zabel, 2017, Kuvshinov and Zimmermann, 2019) with recent evidence suggesting that this pattern can be explained via bank lending: domestic banks with higher exposure to sovereign risk on their balance sheets cut loans to the private sector more aggressively (Acharya et al., 2018 and Palmén, 2020), negatively affecting the output of firms linked to this banks (Arellano et al., 2019). This project aims to empirically test the employment consequences of the bank lending channel through its effect on labor market frictions (i.e., changes in hiring and laid-offs) during Brazil's 2013-2015 sovereign risk episode. The study combines bank-level balance sheet data on corporate loans, interest rates, and government debt portfolios with detailed employment data at the establishment level from RAIS (*Relacao Anual de Informacoes Socials*). The empirical strategy exploits variation in pre-crisis bank-level and municipal-level exposure to changes in government sovereign spread. Our exposure measure at the bank level is used to provide supporting evidence on the bank lending channel. In contrast, we use the municipal-level exposure measure to find if hiring and laid-off rates of municipalities with highly exposed banks in their territory differ from municipalities with low exposure.

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