Research Statement

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My research lies at the intersection of econometrics and macroeconomics. I develop and apply novel causal inference tools to address fundamental questions in macroeconomics. I work extensively with both time-series and panel data, and I leverage the potential outcomes framework in both settings to make explicit the identifying assumptions behind causal claims. I specialize in local projections, quantile regression and difference-in-differences to study phenomena ranging from growth-at-risk and financial stability to firm dynamics and policy evaluation. While my primary contribution is methodological, my work is deeply motivated by macroeconomic theory and employs structural models to validate and interpret empirical findings. My research bridges econometric methodology with macroeconomic theory by using structural models to inform causal identification strategies and to serve as lab economies in Monte Carlo experiments. An overarching theme of my empirical work is treatment heterogeneity. In particular, I use tools such as quantile regression, state-dependent local projections, nonlinear functional forms to zoom in on how treatment effects vary across the outcome distribution, treatment context and intensity.

In my job market paper titled "Identifying Unconditional Quantile Impulse Responses with an Application to Growth-at-Risk'" (Wojciechowski 2025) I introduce generalized quantile local projections (GQLP), a novel methodology for identifying structural quantile impulse responses that explicitly distinguishes treatment from control variables. Unlike existing methods that estimate conditional quantile effects, GQLP identifies causal effects on unconditional quantiles while still exploiting controls for identification. This distinction is crucial for studying growth-at-risk, as unconditionally low growth rates correspond to actual downturns rather than merely periods of disappointing growth performance relative to prevailing conditions. To establish when quantile analysis is necessary, I prove a quantile invariance theorem that states that interesting quantile dynamics require departures from either linearity, Gaussianity, or stationarity. This theorem establishes a lower-bound on model complexity needed to generate quantile impulse repsonses that differ from the mean impulse response. As analytically characterizing the true quantile responses in non-linear models from the model's equations is challenging, I develop a generally applicable algorithm to recover them by simulating the model. I then use a nonlinear DSGE model and an endogenous volatility SVAR model in a Monte Carlo study to show that GQLPs with timing restrictions produce estimates equivalent to a regression on the unobservable structural shock only—a property shared by standard SVARs and local projections but not by the conventional quantile local projections.

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Applying GQLP to study financial shocks' impact on U.S. industrial production growth reveals striking asymmetries with direct implications for macroprudential policy design. Credit risk and volatility risk shocks generate losses of approximately 2 percentage points at the 10th quantile of the growth distribution—four times larger than the 0.5 percentage point effect on median or upper quantiles. These results are robust across specifications and consistently larger than those obtained using exisitng quantile methods, suggesting previous literature may have systematically underestimated tail risks. The asymmetric effects rationalize key predictions from macrofinance models featuring occasionally binding constraints and financial amplification mechanisms, while providing novel empirical evidence that stabilizing financial conditions can prevent severe recessions without sacrificing growth during expansions. Beyond growth-at-risk, the methodology has broad applicability to inflation-at-risk analysis for monetary policy and state-dependent fiscal multipliers for optimal government spending timing.

In "Unlocking Growth? EU investment programmes and firm performance" (De Sanctis et al. 2025) I tackle the challenge of policy evaluation when program participation is endogenously determined. The paper links firm-level data from Orbis with project-level information from the Kohesio database to create a novel dataset covering EU Cohesion Policy—one of the world's largest regional development programs. The fundamental identification challenge is that firms receiving funding differ systematically from those that do not, making naive comparisons subject to selection bias. To address this, I implemented a two-pronged empirical strategy: first using lasso-penalized logistic regression to let the data reveal which firm characteristics predict receiving funding, then implementing local projection difference-in-differences using only eventually-treated firms to exploit variation in treatment timing. This approach addresses both selection on observables through the rich set of controls identified by the lasso procedure and selection on unobservables by only comparing firms that eventually receive funding but at different times.

The results reveal that EU funding allocation favors a specific profile of firms—larger, growing, productive SMEs under moderate financial pressure—suggesting policymakers target firms with high growth potential rather than those most in need. The lasso procedure identifies non-linear selection patterns, with firms just above the 10th percentile of leverage and current ratios disproportionately supported while those at median thresholds see lower odds, indicating selection of financially stretched but viable enterprises. Regarding treatment effects, firms receiving funding experience persistent productivity increases of approximately 3% after four years, with heterogeneous effects across firm types and funding categories. Smaller and more financially constrained firms benefit disproportionately more, and funding explicitly targeting SME investment generates larger productivity gains than green transition projects. These findings inform the ongoing debate about industrial policy effectiveness and optimal targeting, demonstrating that while the program generates positive firm-level effects, its allocation mechanisms could be further optimized to maximize productivity growth.

In "New Stylised facts on Firm and Productivity Dynamics" (Caggese et al. 2025b) I study how firm dynamics drive the increasing polarization in productivity distributions across industries, applying and extending the Melitz-Polanec decomposition methodology to understand whether growing gaps between frontier and laggard firms stem from incumbent dynamics or entry-exit patterns. I develop novel polarization measures that capture sales-weighted deviations from median productivity and decompose changes into contributions from

continuing firms, entrants, exiters, and firms switching between productivity groups. This decomposition reveals whether increasing dispersion results from frontier firms pulling further ahead, new entrants entering at higher productivity levels, or laggards falling further behind. Preliminary results suggest that entry dynamics and switchers play a more important role than previously thought, challenging theories that attribute increasing dispersion primarily to persistent technological advantages of incumbent leaders. This work contributes to understanding the microfoundations of aggregate productivity dynamics and has implications for competition policy and innovation strategy.

As a research assistant for Prof. Andrea Caggese I worked on the empirical analysis for "Climate Change, Misallocation, and Macroeconomic Implications" (Caggese et al. 2025a). Together with the authors of the paper we estimated the economic damages from climate change using firm level, rather than aggregate data. This involved working with a large daily gridded weather data covering Europe from 1950 on a 10x10 km grid, firm-level data, and climate projections data. I transformed the large daily weather dataset into annual indices of abnormal weather, then geomerged firms' registration addresses to the nearest grid points to estimate firm-level damages. These estimations, combined with warming projections, allowed us to quantify economic losses under various future warming scenarios. The papers findings indicate a significant and nonlinear relationship between climate change and aggregate productivity, with a projected 2-degree Celsius increase leading to a 1.8% decline. Doubling the expected increase to 4 degrees exacerbates the decline nearly fourfold to approximately 6.4%.

In my future research, I plan to extend the GQLP methodology in several promising directions. First, I intend to incorporate instrumental variables identification strategies—an extension that is straightforward given that the generalized quantile regression estimator underlying GQLP already accommodates instrumental variable identification. Second, I aim to develop smoothing techniques for the GQLP framework, building on recent advances in smooth local projections. Beyond these methodological refinements, I see particularly promising applications in studying inflation-at-risk, where GQLP could reveal how monetary policy shocks differentially affect inflation outcomes across high versus low inflation environments, providing crucial insights into asymmetric policy transmission. Another compelling application involves examining state-dependent fiscal multipliers—specifically, how government spending effectiveness varies between expansions and contractions—which could fundamentally inform optimal fiscal policy timing. More broadly, I am committed to developing econometric tools that make causal inference more credible in macroeconomic settings while maintaining close dialogue with economic theory. My research agenda centers on bridging the gap between methodological rigor and policy relevance, ensuring that the tools I develop address questions that matter for economic stability, growth, and welfare.

References

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