National and International Call for Postdoctoral Fellowship Applications

Fellowships linked to the FAPESP Thematic Project “Econometric Modeling and Forecasting in High-Dimensional Models”, in association with FGVquantfin – Center for Quantitative Studies in Economics and Finance (CEQEF-FGV).

FGVquantfin invites applications for two (2) postdoctoral fellowships under FAPESP Grant 2023/01728-0. The project is coordinated by Prof. Pedro Luiz Valls Pereira.

1) Overview of the fellowship research areas

(1) Forecasting methods for high-dimensional financial data – development, implementation, and analysis of computational tools – supervisor: Prof. Pedro Luiz Valls Pereira;

(2) Judicial high-dimensional footprints of Brazilian firms – development, implementation, and analysis of computational tools – supervisor: Prof. Marcelo Fernandes.

The fellow in research area (1), “Forecasting methods for high-dimensional financial data”, supervised by Pedro Valls Pereira, will develop and evaluate models for forecasting and measuring climate risks and their economic and financial effects, with an emphasis on advanced statistical and computational methods. The methodological core includes:

- hierarchical Bayesian spatiotemporal models with discrete and continuous spatial dependence structures;
- methods for constructing, aggregating, weighting, and validating indices;
- dependence and extreme-event models (copulas and compound-event structures) for portfolio tail risk;
- mixed-frequency and high-dimensional variable-selection models combining daily and spatial climate data with monthly economic series.

Forecasts from different models will be compared and combined. Out-of-sample evaluation will use point forecast metrics (mean absolute error and root mean squared error), predictive ability tests, and criteria for evaluating density and tail-risk forecasts.

The project's main application is the modeling and forecasting of climate risks and their economic and financial effects in Brazil. This work will be developed through a collaboration currently being established with Alpha-Klima (Madrid), which intends to make its climate databases available for non-commercial academic use and provide advice on processing these data. Alpha-Klima's modular framework links climate hazards, exposure, vulnerability, dependence across assets, and their translation into financial metrics. This framework will be combined with the group's expertise in time series econometrics, forecasting, and high-dimensional models. The agenda comprises five research strands.

(i) Climate indices calibrated for Brazil. This initial strand provides the foundation for the others. The fellow will contribute to constructing, aggregating, weighting,

and validating indices addressing specific economic questions: agricultural risk, pressure on food prices, and financial portfolio exposure. Aggregation will account for the location of production, each crop's agricultural calendar, and the economic importance of each region.

The methodological foundation is the hierarchical Bayesian spatiotemporal framework developed in a paper with Márcio Laurini (FEARP-USP). This framework organizes climate dynamics by biomes and ecoregions and combines:

- biome-specific stochastic trends;
- seasonal and cyclical components;
- sub-biome effects;
- discrete (Besag/ICAR) and continuous (Matérn/SPDE) spatial dependence, estimated using INLA.

The proposed extension will apply this structure to Brazilian biomes and variables relevant to agricultural production, such as temperature, precipitation, and drought indicators. Indices with explicit uncertainty quantification will be derived from this structure. Validation will assess both climate consistency and the ability to explain and forecast economic variables out of sample.

(ii) From crop vulnerability to the price level. This strand investigates the chain linking climate events, productivity losses, food prices, and headline inflation. It starts with crops and regions selected according to data quality and their importance for production and consumption. It includes large-scale shocks, such as El Niño episodes, for which seasonal forecasts available months in advance can serve as predictors. The central question is whether climate measures improve price and inflation forecasts relative to benchmark models. The central banking literature relies primarily on local projections and reduced-form models. This strand seeks a more structural representation of transmission that separates climate effects from factors such as exchange rates, international prices, and demand. It directly draws on the project's methodological core: mixed frequencies (daily and spatial climate data combined with monthly price series), high-dimensional variable selection, and forecast combination.

(iii) The agricultural insurance protection gap. Subsidized agricultural insurance coverage has declined sharply in recent years. This strand overlays climate exposure, planted area, and insurance coverage to identify where high risks coincide with low protection, by region and crop. The analysis will carefully distinguish insured area, the number of covered producers, and insured value. This strand will be developed jointly with Humberto's team [surname/institution].

(iv) Physical risk and credit risk. This strand models the chain linking a measure of physical hazard at the borrower's location, such as flood depth or drought intensity, to changes in the probability of default. Recent regulation has begun to require financial institutions to assess this relationship. The work will build on a recent approach proposed in a BIS working paper and on dependence models (copulas and event structures) for portfolio tail risk. The aim is to test the approach on a Brazilian agricultural credit portfolio through a pilot project with a financial institution, subject to data access.

(v) The cost of not adapting. This strand combines hazards, exposure, and damage functions at the regional level to estimate counterfactuals: expected losses without adaptation, compared with the cost of adaptation measures and the share of losses they actually prevent.

Strands (i) and (ii) are priorities and share data and validation procedures. Strands (iii) to (v) will be developed subject to the availability of data and partners. The collaboration also envisages the possibility of developing climate exposure measurement tools and training activities for stakeholders subject to the new regulatory requirements. These activities will comply with data-use conditions and FGV's institutional procedures.

In addition to methodological advances, the project aims to contribute to the international literature on financial forecasting and climate risk quantification. It also seeks to foster academic interaction among FGVquantfin – CEQEF (EAESP-FGV), MacroLab (EESP-FGV), CAREFS (UNICAMP), FEARP-USP, and Alpha-Klima, with a view to publishing the results in high-impact journals.

The fellow in research area (2), "Judicial high-dimensional footprints of Brazilian firms", supervised by Prof. Marcelo Fernandes, will investigate the extent to which information extracted from judicial documents can address the scarcity of data on Brazilian firms, particularly privately held firms, and improve forecasts of employment, financial distress, judicial reorganization, bankruptcy, and firm survival.

Labor lawsuits, debt enforcement proceedings, and judicial reorganization and bankruptcy proceedings record information on employment relationships, creditors, liabilities, and corporate restructuring. The project will organize these records into a temporal database, linking firms to public registries and assessing the quality of firm identification and extracted information. Data collection will use public sources and, where necessary, depend on formal data-access arrangements, without assuming access to restricted documents.

The research comprises three strands. The first involves constructing and validating the document corpus, extracting information using language models, and comparing the results with deterministic rules and other natural language processing methods. The second involves building a panel recording data release dates and comparing high-dimensional forecasting models, including regularization, factor models, machine learning, and forecast combination. Discrete-time duration models with competing risks will be considered for different forms of firm exit or reorganization, with out-of-sample evaluation and controls to prevent the use of future information.

The third strand covers applications to employment dynamics and firm performance, judicial signals of financial distress, and judicial reorganization and bankruptcy. Firm networks may also be constructed using joint participation in lawsuits, shared counsel, business groups, and published debtor–creditor relationships to investigate the transmission of shocks. The analyses will account for the selection of litigating firms, the structural absence of judicial information, and measurement errors. Data use will comply with applicable data protection and access requirements; no individual firm scores will be published or transferred.

Timeline, Materials and Methods

The fellow in research area 2 will conduct research in collaboration with CEQEF, the Thematic Project team, and EESP-FGV researchers, participating in academic activities and seminars. In the first year, the priority will be database construction, including the definition of sources, access arrangements, pilot collection, firm identification, and the annotation protocol. In the second year, measurement, validation of extracted information, and the panel structure will be consolidated, with preliminary predictive results and preregistration of the forecasting protocol in month 20. In subsequent years, network analyses and at least three papers will be developed for submission to international journals. The work requires familiarity with language models, prompt engineering, agent-based artificial intelligence systems, and machine learning methods. If access to particular sources proves infeasible, the empirical scope will be adjusted to the available public sources while preserving the methodological contribution.

References

Ash, E.; Hansen, S. (2023) Text algorithms in economics, Annual Review of Economics 15, 659–688.

Battaglia, L.; Christensen, T.; Hansen, S.; Sacher, S. (2025) Inference for regression with variables generated by AI or machine learning, working paper, arXiv 2402.15585.

Fan, J.; Masini, R. P.; Medeiros, M. C. (2023) Bridging sparse and factor models, Annals of Statistics 51, 1692–1717.

Gentzkow, M.; Kelly, B.; Taddy, M. (2019) Text as data, Journal of Economic Literature 57, 535–574.

Giannone, D.; Lenza, M.; Primiceri, G. E. (2021) Economic predictions with big data: The illusion of sparsity, Econometrica 89, 2409–2437.

Ponticelli, J.; Alencar, L. S. (2016) Court enforcement, bank loans, and firm investment: Evidence from a bankruptcy reform in Brazil, Quarterly Journal of Economics 131, 1365–1413.

Additional Information

These fellowships are open to researchers from any higher education or research institution in Brazil or abroad who obtained their PhD less than seven (7) years ago and have an outstanding record, to contribute to research at an institution located in the state of São Paulo. The fellowship requires exclusive dedication to the research project. For further information on requirements and commitments, please consult FAPESP's general criteria at https://fapesp.br/bolsas/pd.

If the selected applicant has previously held a FAPESP fellowship in a category equivalent to a postdoctoral fellowship, that period will be deducted from the maximum duration of the awarded fellowship.

FAPESP postdoctoral fellowships have a duration of up to 48 months. The monthly stipend is BRL 12,570.00 (November 2025), plus a research contingency fund equivalent to 10% of the annual fellowship amount.

Requirements for Working at FGVquantfin

In addition to other factors considered during selection, applicants must meet the following requirements:

1. Hold a PhD in economics, finance, another applied social science, statistics, engineering, or applied mathematics;
2. Be fluent in written and spoken English;
3. Have academic publications or working papers produced within the past five years, particularly articles in peer-reviewed journals;
4. Commit full-time to research;
5. Be able to present scientific findings to the research group, both orally and in writing;
6. Be available to work on site in São Paulo, in collaboration with the FGVquantfin team;
7. The selected applicant is expected to participate in the activities organized by FGVquantfin in São Paulo.

Specific tasks include preparing annual reports, building databases, participating in conferences, seminars, and other collective project activities, such as study groups, and preparing manuscripts for publication.

Applications

Applications will remain open until 7 December 2026 at 6:00 p.m.

Interested applicants should apply by email to FGVquantfin@fgv.br, using the subject line “Pos doc FGVquantfin” followed by the title of the research area for which they are applying, and submit the following documents in English:

i. A brief CV in English (maximum 4 pages);

ii. A cover letter in English (1 page);

iii. Three sample publications, preferably including an international publication in English with the applicant as first author. Thesis chapters are also acceptable.

Selection Process

The selection process will consist of two stages:

i. Eligibility screening: review of the submitted documents to assess compliance with the criteria set out in this call and FAPESP's criteria;

ii. Ranking: interviews.

Applicants residing outside São Paulo may request an interview via Skype, Zoom, or Teams; however, as stated above, availability for regular on-site work is a requirement for selection.

The selection results will not be publicly announced. Applicants will be notified at the email address provided in their application.

Schedule

- Application deadline: 7 December 2026 at 6:00 p.m.
- Notification of first-stage results: 9 December 2026
- Interviews: from 10 December 2026
- Final results: 15 December 2026
- Start date: 1 January 2027