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LETTER FROM THE **PRESIDENT**

CARLOS IVAN
SIMONSEN LEAL

President,
Fundação Getulio Vargas

A LEAP INTO THE FUTURE

The year 2020 imposed historic challenges for Brazil and the rest of the world, while dramatically accelerating the arrival of the future. The coronavirus pandemic caused changes to the economy and society in a matter of months, which would otherwise have taken decades to materialize.

In this context, FGV, which was founded 76 years ago in order to promote Brazil's development, mobilized all its forces, in various areas of activity, from research to teaching, from economics to public health, in order to innovate. Much more than just adapting to the pressing needs generated by the pandemic, FGV invested to make a leap forward in its scientific production and in the implementation of new processes and technologies.

Today, it is necessary to generate more effective and efficient public and employment policies. It is necessary to move toward a more modern and inclusive health system, an education structure that embraces technology and puts Brazilians on an equal footing with developed nations and a regulatory framework that makes the country competitive and attracts investments continuously.

Without a doubt, the year 2020 highlighted the need to start building Brazil in the next 50 years. And to achieve this goal there is only one path: to generate, teach and apply cutting-edge knowledge.

Based on this principle, FGV was able in just one week to digitize its entire teaching and research infrastructure, in a process that involved support and training for professors and students regarding the implementation of new technological and educational tools.

The results were seen throughout the year, as FGV's schools maintained and improved their performance at the top of the Brazilian Education Ministry's General Course Index, in unprecedented circumstances. FGV was also rated the world's third best think tank and the best administered think tank in the University of Pennsylvania's 2020 Global Go To Think Tanks Index Report.

Also in 2020, FGV obtained more maximum scores for its courses in Guia da Faculdade, a university guide published by Quero Educação in partnership with the O Estado de S. Paulo newspaper, than any other private sector institution in Brazil. Internal evaluations of students also gave all FGV's schools and teaching centers (which operated completely remotely) top marks. In another clear reflection of its commitment to excellence and innovation, FGV became the first education institution in Brazil to use cloud-based virtual laboratories.

This is a legacy that will extend far beyond the past year. In order to face and overcome the harsh effects of the pandemic, multidisciplinary coordination between FGV's different spheres and national and international partners has been expanded exponentially, as well as the scope of various broad initiatives and projects in areas such as applied mathematics, epidemiological mapping, security, artificial intelligence, data protection legislation, public and private administration, national defense, macroeconomics and urban mobility.

The ability to leverage new forms of communication and knowledge production, imposed at a speed that was previously unthinkable, will result in an organization that is infinitely more agile, accessible and global.

In this way, FGV is better prepared to make major contributions to Brazil's economic productivity, quality of life, social inclusion, the efficiency of public and private sector services and sustainable development, helping put Brazil at the international forefront of scientific development and applications, for the benefit of all Brazilians.

APPLIED RESEARCH PROJECTS

In order to pursue its mission, which is to promote Brazil's socioeconomic development, FGV carries out research and studies that underpin public discussion between researchers and representatives of the public and private sectors.

Even in an atypical year like 2020, the dissemination of knowledge through academic research produced by FGV's different areas did not stop.

Among this extensive intellectual output, 15 applied research projects were selected by FGV's Research and Innovation Commission, which deserve to be highlighted due to their contribution to the advancement of social sciences and their impact on society.

WATER RESOURCES REGULATION IN BRAZIL

This paper examines the desirability and feasibility of creating water markets to promote the efficient reallocation of water in Brazil, a country with abundant but unevenly distributed water. A first-principles analysis shows that water markets may dominate other instruments, including water pricing (that is, a price above and beyond the cost of storing and transporting water, to reflect water scarcity).

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Organization:
Center for Studies and Regulation of Infrastructure (CERI)

Support:
Inter-American Development Bank (IDB)

OBJECTIVE

- To examine the advantages and feasibility of creating water markets in Brazil as to promote efficient reallocation of the resource.

RESEARCH METHODOLOGY

The paper presents an analysis of the legal, regulatory and political frameworks of water resource management in Brazil. To assess the feasibility of water markets, a readiness assessment is conducted to identify the main barriers to the creation of water markets in Brazil considering the following components: (i) regulatory structure of water use rights; (ii) institutional governance; (iii) availability of data; (iv) operational rules; (v) existence of a market for trading water use grants; and (vi) provisions to deal with externalities. Policy recommendations are then provided on how to overcome the barriers identified in the analysis. For illustration purposes, the gains are simulated from a water market in the São Marcos River Basin, where agriculture and hydroelectricity generation activities compete for existing water resources.

RESULTS

The first-principles economic analysis shows that water markets can dominate water pricing mechanisms. The readiness assessment undertaken identifies some legal and institutional barriers to the creation of water markets in Brazil. Hence further reforms are advisable to promote efficient water markets. Policy recommendations are then provided to overcome the barriers identified in our analysis. The case study of the São Marcos River Basin indicated that the creation of a water market could lead to more efficient allocation and welfare gains.

WHAT'S NEW

Aiming to assess the potential gains from the implementation of water markets in Brazil, we simulate a market for the São Marcos River Basin. Assuming a scenario where the market regulator imposes a restriction on the use of water that generates 30 percent excess demand with prices set to zero, we find that, if a linear rationing system is applied, total loss of welfare would be 30 percent. However, if a market for water exists and works in a competitive way, we estimate that the total loss of welfare would be only 2.5 percent. The case study highlights how the creation of a water market can overcome inefficient allocation.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

Conflicts over water use have become increasingly frequent in many areas across Brazil, and they are likely to be aggravated by climate change and soaring demand. Additionally, the existing mechanisms for addressing water scarcity are inefficient in that they do not incentivize the reallocation of water towards its highest value use. In this sense, this paper examines the desirability and feasibility of creating water markets to promote the efficient reallocation of water. The readiness assessment developed in the paper can be adapted and extended to improve water management in areas plagued by conflicts among multiple uses.

LATIN AMERICAN URBAN BIG DATA:

A PANORAMA OF THE PUBLIC AND PRIVATE DATA AVAILABLE ON THE CITIES OF SÃO PAULO, MONTEVIDEO, QUITO, XALAPA AND MIRAFLORES

Managing cities and conceiving public policies in a context of increasingly fast social and technological changes are challenges that have led to debates and reflections in various sectors of society. But at the same time new technologies are introduced, many cities have low capacity to transform the data generated into relevant information. This causes loss of an opportunity to resolve public problems and promote social and economic development based on these data. This investigation identifies to what extent the urban data are available and accessible regarding five Latin American cities – São Paulo, Montevideo, Quito, Xalapa and Miraflores – and verifies the quality of these data for the purposes of planning sustainable urban policies. Based on this analysis, the study describes a consistent prognosis and makes a set of recommendations to improve the publication of data and create opportunities to model public policies for open innovation and generate public value attributed to the available open data.

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Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV) and Inter-American Development Bank (IDB)

OBJECTIVE

- The general objective of this study was to identify opportunities to use data to resolve complex public problems on themes that are strategic for the development of five Latin American cities: Miraflores (Peru), Montevideo (Uruguay), Quito (Ecuador), São Paulo (Brazil) and Xalapa (Mexico).

RESEARCH METHODOLOGY

Detailed mapping was carried out on the availability of data on the five cities studied, along with in-depth analysis of the quality of the data of interest.

Preliminary investigation and analysis:

- Interviews with key public officials to identify government programs, open data projects and themes of potential interest.
- Classification into five thematic groups (Social and Human Development; Urban Development; Economic Management and Development; Environment; and Mobility) and creation of 13 categories and 51 subthemes.
- Active search for data pertaining to each subtheme in each city at the portals indicated by city managers and various administrative bodies and entities responsible for public policies in each city that could potentially present disaggregated databases.

Analysis of the quality of the databases:

- Validation of the mapping with representatives of the cities.
- Definition and validation of the scope of analysis to detail the quality of available databases.
- Construction of a matrix for evaluation of the data quality, according to international open data standards.

Consolidation:

- Analysis of the quality of the databases according to the evaluation matrix constructed.
- Formulation of recommendations to qualify and publish the data.
- Identification of opportunities for analysis of public policies and generation of public value with the available data.

RESULTS

The quantity and quality of the open data found for each city investigated varied widely. However, the problems initially diagnosed are common among all of them: (i) discontinuity of programs and projects due to changes in the political cycle and interruption of programs; (ii) inoperable links, obsolete databases or websites that no longer publish data or do not update existing data; and (iii) dispersion of data in many websites, including in cities that declare they have open data portals.

All told, 289 open databases were found in the five cities, on themes related to local sustainable development. Given the characteristics of these, five groups were formed: mobility and environment; social and human development; urban development; management; and economic development.

Each of these bases were evaluated according to the degree of availability, by municipality and by theme. Recommendations were formulated to improve the process of publishing data in these cities:

- **Declaration of frequency.**
  This is fundamental information for effective publication – including for alignment of the expectations of users and to avoid individual requisitions of data. Seventy-six percent of the databases analyzed in the cities did not specify the frequency of updating. In cases when data are produced promptly, without forecast for new publications, it is important to indicate this information to users. It is recommended to make a distinction between the last update of data on the platform and the last date of checking the data at its source, which can be very useful for users of these data.

- **Specification of the license.**
  For data to be considered open, the data must be covered by an open license, allowing its reuse without the need without the need to request permission. It is important for this permission to be specified at the site of publication, in the metadata archives or in both places. Some governamental bodies can opt to use different types of licenses, as long as they allow freedom of redistribution and reutilization. The only recommendation is that the declaration of license should be easily locatable in the context of publication of the data.

- **Availability of open format alternatives.**
  In general, the databases analyzed are machine processed, i.e., data are published in a structured format that allows automated reading. It is necessary, however, that the file format also be open, or not proprietary. The open standards allow access by free software or any other program intended for that purpose.

- **Documentation and metadata.**
  It is necessary to provide good documentation so as to avoid mistaken interpretation of users, in the form of a data dictionary containing description of the variables and other fundamental information, such as its source, where the data were collected, the body responsible for collection and other characteristics. Gathering information about the data in a metadata file would be an important improvement in various situations.

- **Completeness.**
  It is possible for databases to contain gaps (missing data). These cases should receive some type of treatment, so that users are informed of the reason for the absence of values in databases.

WHAT'S NEW

In the past decade, a debate has been growing about the so-called "evidence-based public policy", which can be defined as the formulation and evaluation of policies guided by data, massive (big data) or not, and the use of digital analysis methods. In this context, data can be used in innovative ways for characterization, analysis and resolution of public problems.

Initiatives are under way for joint use of open databases from administrative sources (such as statistical microdata) and private sources of information, only sometimes publically available. This potential connection, however, is little explored, as is the use of advanced analyses of information and techniques for data mining and segmentation of profiles, predictive analysis and other tools currently available.

The evaluation of the availability and quality of data, the identification of gaps and indication of replicable practices and strong points are opportunities for cities to improve their open data policies.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The investigation allowed identifying opportunities for analysis, formulation and evaluation of public policies based on evidence. With the mapping of the open data in the five cities, information was obtained that can potentially allow the realization of analyses of policies on use of these tools, aiming to resolve pressing problems in the areas of mobility, environmental quality, education and health, etc. For example, these data can be enriched if connected to external tools and made available to the public, such as via Waze, a mobile phone application used by millions of people around the world to trace out routes – and present in the five cities. In particular, it would be possible to construct a model to forecast accident rates based on the high-frequency data on speed obtained from the application and historical georeferenced data on traffic of the cities.

Notwithstanding the various possibilities for application, these will not be possible without a first step, consisting of the investigation of data said to be open. This was the scope of the present investigation, representing a starting point from which mapped and evaluated data have their state of openness carefully demonstrated so that it will be possible to envision their potential use as inputs for production of studies and tools for other initiatives that make use of cross-referencing data in the ambit of the cities involved in this study.

CREATION OF A CONSUMER PRICE INDEX BASED ON WEB INFORMATION (IPC-W)

Based on the initiative called "The Billion Prices Project" (BPP), developed by Professor Alberto Cavallo of MIT, as described in Cavallo and Rigobon (2016)[1], the project has created the potential to reduce the costs of gathering data and calculating traditional indexes, besides providing more disaggregated information with higher frequency regarding price levels.

OBJECTIVE

- To construct a price index using only data collected online.

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Support:
Applied Research Fund of
Fundação Getulio Vargas (FPA FGV)

RESEARCH METHODOLOGY

The first stage of the project was to collect data. For this purpose, we identified the most important dimensions of the current Consumer Price Index (IPC – calculated by FGV IBRE) and data providers. Then we defined a robust and scalable process for gathering data on prices available online. The second stage was calculation of the index numbers using the collected data. Therefore, we classified the products within the structure of products used by FGV IBRE, treated them to deal with the idiosyncratic characteristics of these data, and finally aggregated them to calculate an index number. These steps are described in more detail below.

[1] Cavallo, Alberto, and Roberto Rigobon. 2016. "The Billion Prices Project: Using Online Prices for Measurement and Research". *Journal of Economic Perspectives*, 30 (2): 151-78.

Choice of the dimensions and providers
We determined that the first dimension covered by the project would be "foods", because these products have heavy weighting in household budgets. Subsequently, other groups can be included, such as white goods (refrigerators, stoves, etc.), pharmaceuticals, stationery and clothing.

We selected online supermarkets – some with regional presence and others national – to start the process of extracting prices.

Collection of prices – "Price Collector"
The web scraping of the data is the most critical stage of the project, and also the one that demands the greatest maintenance efforts. To enable the extraction of prices from the original websites, it is necessary to circumvent some protection measures, such as blocking of IPs, restriction on access of robots or random listing of products, among others.

FGV's School of Applied Mathematics (EMAp) developed "Price Collector", a tool that automates and unifies the process of gathering data, with the objective of obtaining the largest number of prices with the minimum requisitions, in distributed form. The software's functioning is simple:

1. It builds a daily list of data providers (sites-departments) and allocates robots to carry out the price collection process.
2. New products are added to the database and prices are updated in case of changes. Products not found are marked as "removed".
3. Additional information (SKU, description etc.) also is collected.
4. At the end of the process, statistics from the extracted data are generated.

Only the deltas (differences) of prices since the last visit are stored. Therefore, if a price remains the same, only the date of the visit is updated. This strategy keeps the database cleaner. However, to obtain the history of prices, it is necessary to "hydrate" the database. It is possible to determine if a product needs to have the price normalized by the weight, which is done during the process of reconstructing the analytic base.

Database
The extraction structure requires a high-performance database server, because with each interaction, the robot inserts a large quantity of data. The structure of the database and the computer programs take into consideration the reduction of its size and minimization of requisitions.

Post-processing of the data
After collection, the products are classified within the structure supplied by FGV's Brazilian Institute of Economics (IBRE). Due to the large number of products extracted, it was necessary to develop a process of whitelisting and blacklisting for each of the categories. In the first step, only the products containing certain keywords in their name/description enter the process. Next, products containing other keywords are removed. Although simple, this algorithm is robust, although it does depend on human intervention to create these lists. A tool was developed to facilitate the creation of lists for a base of products.

Calculation of the index
After extraction and classification of the products, the next process is to calculate a price variation index. Traditionally, a sampling plan is defined containing specific products about which data are collected manually in stores and supermarkets. The BPP selects URLs for online collection of the prices of these selected products. In this project, we extracted all the products listed, which posed challenges about how to aggregate the products.

Some of these challenges are: possible sources of sample bias; lack of representativeness of some products; identification of "gourmet" products; cost of delivery of products; and large quantities of missing data, among others. The evaluation of the sample bias is a separate problem that must be carefully studied in the future. The lack of representativeness of some products (such as French bread) can be overcome by increasing the number of providers. However, this can still generate a possible bias if the dynamic of prices of online and offline providers is different, such as online supermarkets versus bakeries. In this study, the product delivery cost was ignored, but this should be taken into account for precise calculation of the final price variation. The processing of "gourmet" products requires a division in the classification of products and can be identified using techniques for detection of groups. The aggregation of product prices requires a minimum number of observations distributed in the period.

After the data has been aggregated, the price variation index is calculated following the same formula utilized for calculation with the offline data. An application programming interface (API) was created in the Python language to carry out these calculations.

RESULTS

The project generated computer programs, a high-frequency price database and studies to understand the nature of the extracted data. The two main products are the Price Collector and the database of products and prices extracted from 13 information suppliers.

During the project, price data were collected on more than 50 million products from various providers, with daily frequency.

WHAT'S NEW

The characteristics of the project are pioneering, given that as yet there is no institution in Brazil that computes this type of index of online prices. On the other hand, efforts in this respect are occurring today in the United States (Horrigan, 2013)[2], United Kingdom (Breton et al., 2015)[3], New Zealand (Krsinich, 2015)[4], Netherlands (Griffioen et al., 2014)[5] and Norway (Nygaard, 2015)[6], all recent and performed by governmental institutions.

[2]Horrigan, Michael W. "Big Data: A perspective from the BLS". *AMSTAT news: the membership magazine of the American Statistical Association* 427 (2013): 25-27. [3]Breton, Robert, et al. "Research indices using web scraped data". Office for National Statistics UK (2015). [4]Krsinich, Frances. "Price Indexes from online data using the fixed-effects window-splice (FEWS) index". Ottawa Group, Tokyo, Japan (2015): 20-22. [5]Griffioen, Robert, Jan de Haan, and Leon Willenborg. "Collecting clothing data from the Internet". *Proceedings of Meeting of the Group of Experts on Consumer Price Indexes, May*. Vol. 2628. 2014. [6]Nygaard, Ragnhild. "The use of online prices in the Norwegian Consumer Price Index". Statistics Norway (2015).

As observed by Cavallo and Rigobon (2016), online indexes not only consistently reproduce the official indexes, they also tend to anticipate them, possibly indicating they are more sensitive to aggregated shocks. Besides this, they have the ability to approximate hedonically adjusted indexes in sectors with products that have overlapping life cycles, as is the case of electronic products.

Indexes of online prices have been contributing to the understanding of phenomena related to the rigidity of prices, as shown by comparing the studies of Cavallo and Rigobon (2015)[7] and Campbell and Eden (2014)[8], which indicates that the difference in the distribution of price variations depends on the source used.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The most natural extension is the diversification and expansion of the collection of prices to calculate price indexes. Besides this, given the extensive nature of this collection, it is possible to construct specific/contextualized indexes.

The most immediate extensions of the project include expansion of the collection of prices, in relation both to the number of suppliers and the variety of products. The project was focused on food products, but it could easily be extended to electronics, pharmaceuticals and other products.

The expansion of the price database and increase in the frequency of collection would allow a more detailed and precise analysis of the spatial and temporal differences in the dynamic of prices at disaggregated levels, not possible in official indexes, giving reason to continue developing the project.

With regard to the construction of indexes, the data collected online have some particular characteristics, due to the sale platform, frequency of collection and choice to collect data on all the products in detriment to an *a priori* sampling plan. Two of the most relevant points to be studied in the future are the adherence of an online index to the offline index and the existence of collection bias, which requires experiments.

Another challenge to be overcome is the maintenance of data collectors, because small changes to the sites or protection systems can prevent the robots from collecting data. This demand for continuous monitoring is one of the main challenges in maintenance of the extractors. Over the long run, it will be necessary to implement a scraper for each provider.

Finally, the database constructed allows performing countless economic studies, such as analysis of price rigidity, hedonic adjustment of prices, nowcasting of gross domestic product (GDP) and the IPC, among others. The availability of the database to the academic community will have a large impact on future studies.

[7]Cavallo, Alberto, Brent Neiman, and Roberto Rigobon. "The price impact of joining a currency union: evidence from Latvia". IMF Economic Review 63.2 (2015): 281-297. [8]Campbell, Jeffrey R., and Benjamin Eden. "Rigid prices: Evidence from us scanner data". International Economic Review 55.2 (2014): 423-442.

LOCATION AND OPERATION OF AN AMBULANCE FLEET UNDER UNCERTAINTY

The management of ambulance fleets has relied on models and algorithms based on operational research. The majority of the research tools use statistical optimization models for strategic planning (allocation of ambulances to bases, choice of base locations) and simulation tools for operational planning (control of routes, choice of ambulances to be dispatched in response to emergencies and their destinations afterward). This study proposes a method based on optimization to control the dispatch of ambulances.

OBJECTIVE

- To study and propose computational implementation of mathematical models for management of ambulance fleets, to shorten the time of response and first aid of the Service for Urgent Mobile Response (SAMU) in the city of Rio de Janeiro.

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Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV), National Council for Scientific and Technological Development (CNPq) and Service for Urgent Mobile Response (SAMU)

RESEARCH METHODOLOGY

An operational model is proposed for resolution of the following questions: (1) after each emergency call is received at a call center, to determine which ambulance(s) will be dispatched for this call, or if the call should be put in a queue, waiting for availability of an ambulance; and (2) after each ambulance that is dispatched concludes its task (treating the victim or taking him/her to the hospital), to determine its status in the queue for future dispatch or to what ambulance base to send it.

The formulation allows projections until the end of the relevant time horizon (e.g., the end of the day), using forecasts of emergency calls in the region considered, i.e., it calculates the impact of the current decisions on the objective function in the future.

Ambulances can be dispatched from bases and hospitals and from other locales when on the way to a base, but not when they are in service (traveling to the scene of an emergency, treating victims at the scene or transporting victims to a hospital). In other words, a "prospective" dispatch of ambulances is modeled.

In the model, time and space are discretized. Each emergency call is characterized by its time of occurrence, location and type (to determine the priority). Additional inputs include forecasts of demand, travel time, service time and routes.

The variables for decision are binary, or can be by highest integer if more than one ambulance is necessary to respond to a current emergency. All the decision variables are non-negative. The optimization problems are resolved using the Gurobi™ solver.

Numerical experiments were performed to apply the method to the ambulance management of the Service for Urgent Mobile Response of Rio de Janeiro (SAMU) using data furnished by SAMU itself, in particular historical data on emergency calls over the preceding two years received by SAMU and the locations of the bases and hospitals (10 locations, 33 bases and 9 hospitals).

The optimization model was executed for a planning horizon of one day, and various examples corresponding to different combinations of number of locales, bases and hospitals.

Finally, the simulator was executed to compute the average waiting time with a strategy for various examples (combinations of locales, bases and hospitals) in a set of simulated scenarios.

RESULTS

The average waiting time observed in the simulation with the model was low, much less than the average waiting time obtained with the current strategy of SAMU.

The numerical results are thus encouraging and the proposed solution method is more efficient than that currently used by SAMU to dispatch ambulances.

WHAT'S NEW

This is the first proposal of a dynamic model for planning ambulance operations that takes into consideration nearly all the realistic constraints of this problem (to dispatch ambulances from bases and to response locales according to the capacity of bases and equilibrium of flow at hospitals).

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

Considering the numerical results obtained with the model, we recommend the integration of the optimization tools developed in the software applied for management of ambulances by SAMU Rio de Janeiro.

The research line initiated in the project can be developed considering the following extensions:

1 - considering two-stage models to be resolved with decomposition techniques such as the L-shaped method;

2 – considering multi-stage stochastic models and formulation of corresponding dynamic programming equations to be resolved with Stochastic Dual Dynamic Integer Programming (SDDiP) or ActiveX Data Objects (ADO);

3 – refining the statistical analysis to generate call scenarios that include regressors, such as population density; and

4 – using decomposition techniques for generation of columns to resolve the optimization problems identified in the study more quickly.

THE IMPACT OF THE *SIMPLES* TAX REGIME ON THE PRODUCTIVITY OF BRAZILIAN COMPANIES

This study analyzes whether the tax incentives of the Simples regime (only applicable to small businesses, based on revenue) are generating any distortion in the size of Brazilian companies, and thus negatively contributing to aggregate productivity in Brazil.

OBJECTIVE

- To evaluate if the tax incentives granted by simplified taxation regimes are generating barriers to increased productivity of Brazilian companies.

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Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV)

RESEARCH METHODOLOGY

Initially, a numerical evaluation was conducted of the characteristics of the tax regimes in Brazil (Real Profit, Presumed Profit, and *Simples*), with simulations of the profitability of firms operating under the three regimes.

Then the incentives were analyzed of the different taxation systems regarding the choice between labor and capital, by comparing the capital/output ratio obtained under the three different tax regimes.

Finally, to show the possible impacts that different tax regimes can have on resource allocation and economic productivity in general, a simulation was carried out with distinct firms that aim to maximize their profits.

The firms act competitively and receive prices for their products as given. They choose the taxation system together with the choice of the amounts of capital and labor used in production. The key variable to maximize in the choice of the taxation system is profit. In other words, it is possible for a firm to choose lower sales revenue so as to be taxed at a lower rate, and thus obtain higher after-tax profits.

Therefore, it is possible for the overall productivity of the economy to decline because highly productive firms choose to remain small to be eligible for a lower tax burden.

RESULTS

The *Simples* not only simplifies the assessment and collection of taxes by charging a single levy, it also strongly reduces the overall tax obligation, especially on labor. The lower taxation causes the companies that opt for this regime to generate higher profits, making the system attractive to them.

However, the *Simples* regime generates important distortions:

1 – For being a tax regime on gross revenue, it induces verticalization of the production steps, since it does not allow using offsetting credits from the taxes on intermediate inputs. With this, firms can perform tasks internally less efficiently due to the existing tax incentive.

2 – Firms opting for the *Simples* cannot deduct the ICMS (state value-added tax) on the acquisition of capital goods, which increases the cost of capital and reduces the cost of labor in relation to capital. This causes firms subject to the Simples regime to hire more labor and expend less on fixed assets, resulting in a reduction of the capital per worker ratio, which winds up reducing the labor productivity of companies.

In the simulation carried out, in which the firm simultaneously chose K and L and the taxation system under which to operate, the results showed that the possibility of choosing the *Simples* regime allowed the firms to increase their profits, but at the same time their labor productivity declined, generating a negative impact on the aggregate productivity of the economy.

WHAT'S NEW

The great majority of studies of the results of the *Simples* regime have mainly analyzed its impact on the formalization of companies and workers. This study contributes to the literature by analyzing the impact of the *Simples* regime on the labor productivity of firms and overall productivity of the economy, to show how the incentives granted by this regime affect the choices of companies.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The study shows that the loss of labor productivity of companies that choose the *Simples* regime occurs to the extent they increase their profits for the different revenue brackets, more strongly distorting potentially more productive companies that are in higher revenue brackets.

It also shows there can be loss of labor productivity to the extent firms invest more in the labor factor (instead of capital) to remain "small" and remain eligible for the *Simples* tax regime.

In this sense, given the distribution of productivity of companies, it would be possible to estimate the loss of aggregate productivity of the economy, which can be investigated in future studies.

FISH FARMING AND MALARIA: A MODEL TO CONTROL THE POPULATION OF MOSQUITOES

Fish farming contributes to the transmission of malaria in some parts of the Amazon. It relies on artificial tanks that become attractive sites for mosquitoes to lay their eggs. This work analyzes the problem of malaria in the region of the Alto Juruá River basin, in the state of Acre, proposing a system of differential equations for epidemiological modeling, taking into account the relationship between the lack of maintenance of fish farming tanks and the prevalence of malaria.

OBJECTIVE

- To mathematically model the impact of the frequency of cleaning fish farming tanks on the evolution of malaria in the region of the Alto Juruá River and to provide recommendations about the frequency and intensity of this cleaning so as to eradicate malaria.

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Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV)

RESEARCH METHODOLOGY

The model developed combines the vector-host dynamic of malaria, the life cycle of *Anopheles Darlingi* mosquitoes, and the cleaning and growth of vegetation on the borders of fish farming tanks.

The system includes two types of larval load capacity, representing two classes of fish farming tanks: those with and without larval predator fish. Both capacities depend on the percentage of border covered by vegetation, which is modeled to obey a differential equation containing jumps, more precisely called “impulses”.

The variables of the system are vegetation, susceptible mosquito population, infected mosquito population, larval population in tanks with predatory fish, larval population in tanks without predatory fish, proportion of susceptible human population, and proportion of infected humans.

Theorems were developed on the asymptotic behavior of the proposed system of differential equations, and the system was simulated and analyzed numerically.

The numerical values for the parameters of the system were obtained from a literature review and from interviews and collective activities during a visit to the Alto Juruá River region together with a team from Fundação Oswaldo Cruz (Fiocruz).

RESULTS

In theoretical mathematical terms, there were two main results of the study: the first refers to the total population of mosquitoes, with respect to its convergence to a positive periodic solution or convergence to zero; and the second refers to the proportion of the human population infected with malaria, also with respect to its convergence to a positive periodic solution or convergence to zero. Both theorems supply sufficient conditions in terms of the parameters of the system to determine its asymptotic behavior.

Another important result of theoretical nature is the extension of previous results to dynamics that are less regular. This extension provides the abstract backbone of the two previous theorems.

Besides the advances in terms of mathematical modeling, the analysis permitted concluding that the cleaning of vegetation around the borders reduces the average mosquito population, and this in turn reduces the rate at which malaria spreads through human hosts.

Numerical estimates of the model show it is biologically impossible to eliminate the population of mosquitoes by removing the vegetation on the borders, but this removal can lead to a reduction of the incidence of malaria or even its eradication .

WHAT’S NEW

In recent years, several studies have been published indicating the existence of a relationship between fish farming and the incidence of malaria, but this is the first work to quantify this relationship through a mathematical model.

The study also measures the relationship between the periodic cleaning of fish farming tanks and the incidence of malaria. This is a groundbreaking finding.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The model can illustrate both real and possible situations, and it can be adjusted whenever there are variations of the values of the parameters. It can also be adjusted for application to similar situations in other places.

The results obtained can serve as the basis for educational campaigns. Greater awareness of the relationship between malaria and vegetation on the borders of fish farming tanks can affect people’s behavior, leading to more frequent cleaning of these tanks.

THE IMPORTANCE OF PRECEDENTS IN THE DECISIONS OF THE BRAZILIAN SUPREME COURT

The new Brazilian Civil Procedure Code (enacted in 2015, effective as of 2016) increased the importance of precedents in the process of judicial decisions, taking a significant step toward the common law system. In this new context, a relevant aspect to legal practice is the evaluation of the weight given to precedents in the decisions of the Federal Supreme Court (STF).

OBJECTIVE

- To evaluate the importance of precedents in Brazilian judicial decisions, by analyzing the set of precedents extracted from the decisions published by the STF between 2000 and 2018.

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Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV), Office to Coordinate Improvement of University Personnel (CAPES) and National Council for Scientific and Technological Development (CNPq)

RESEARCH METHODOLOGY

The database used in the study was created and is maintained by the project "Supreme Court in Numbers", sponsored by FGV Direito Rio.

The network of citations used is the result of extracting citations from the 1,152,963 decisions published by the STF between 2008 and 2018 – classified by the Court into 57 categories, known as procedural classes.

Although the most logical procedure to create a network of citations would be to use each decision as a "node", since there is no formal standard in the Brazilian legal system for citation of precedents, it was not possible to identify reliably which specific decision of a determined case was being cited in the text. To overcome this limitation, we decided to group all the voting opinions presented in a case and use cases as the nodes.

Since each case had multiple decisions (interlocutory appeals, motions, etc.), this method created some distortions in the network. To minimize the error in the dating of the nodes, we used the date of the first decision by the STF as the date of the node.

The final representation of the network wound up with 543,759 nodes connected by 2,404,616 links, where 90.6% of the nodes cited at least one other node, and 21.8% were cited at least once.

The cases and the decisions were grouped into five large groups: constitutional (dealing with the constitutionality of laws in the abstract), appeals (seeking to reverse the grounds of decisions by lower courts), criminal (in which the STF has original jurisdiction over accusations against certain federal public agents), writs (writs of habeas corpus and mandamus) and others (all those not fitting in any of the previous classifications).

RESULTS

The first conclusion that can be extracted from the analysis is that multiple profiles for citation exist in the STF, and that different types of cases present distinct behaviors.

In cases involving appeals and writs, the majority of the citations occurred very early in the life of the case. After the first few years, there was a sharp decrease in the citation of prior decisions, indicating that their content rapidly lost importance in decisions in new cases.

The activity to oversee constitutionality of the STF had much longer duration, and the decisions of this type still received a relevant number of citations even 15 years after the original decision. The majority of these occurred around 8 years after the decision. The citations of cases belonging to the other groups mostly occurred in a shorter time frame.

The majority of decisions cited a relatively small number of other decisions, while a minority cited a large number of precedents. Likewise, the vast majority of decisions were cited by a relatively small number of others, and a very small number of decisions were cited with high frequency.

In any given year, it was more probable that the justices cited cases from recent years, indicating that decisions had a relatively short life cycle, with the majority of citations being referred to soon after being rendered.

WHAT'S NEW

Until this study, no automated search had been conducted of relevant precedents in STF decisions, partly due to the huge production of the Court and partly because of the technical challenges resulting from the unstructured nature of STF practises.

This study is relevant regarding the reliance on precedents, considering the singularity of the Brazilian legal system and the STF.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The exploratory analysis developed in this study reveals important challenges to be overcome by researchers in the future so that technology can have a greater impact on the practice of law and academic research.

The traditional techniques to measure the centrality of networks cannot adequately capture the legal relevance of the network of precedents of the Brazilian Supreme Court.

Future studies should quantify, if indeed this is possible, to what extent the idiosyncratic characteristics of the practice of the STF impact the metrics of the network of precedents.

STANDARDIZATION AS A STRATEGY TO DEAL WITH THE CASELOAD OF THE SUPREME COURT

Between 2013 and 2018, each of the 11 justices of the Supreme Court (STF) produced an average of 9,000 decisions. This study reveals that to attain this result, besides using the "general repercussion" mechanism – a filter created by constitutional amendment that enables the STF to select leading cases involving constitutional issues it deems important, with application to all other analogous cases – the justices have been adopting another procedure: rendering virtually identical decisions in similar cases.

OBJECTIVE

- To investigate, by quantitative analysis, the textual similarity among single-judge decisions in cases involving constitutional review of the STF and its relationship with the quantity demands for review of judicial proceedings and the number of decisions authored by each justice.

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Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV)

RESEARCH METHODOLOGY

The dataset of the study was composed of nearly 250,000 individual decisions produced by the STF over the past six years in constitutional review cases (appeals). The decisions of each justice composed a separate collection.

The decisions were categorized by level of standardization, combining measures of similarity, techniques for grouping and reduction of size.

Initially a process was developed to check the similarity of collections of single-judge decisions related to constitutional review cases (appeals) of each justice.

For verification of the similarity between pairs of decisions, each of them was represented by a vector of characteristics, following the "bag of words" model, and the similarity was measured using the "cosine similarity" metric.

This was followed by a quantitative analysis covering six years (2013 to 2018), achieved by hierarchical grouping for categorization of decisions.

The decisions were classified as having maximum, high or low similarity with any other decision, and the limits of the categories were defined by means of notations made by four law students.

To allow visualization of the data, the vector representation of each decision was reduced to a two-dimensional vector using the t-Distributed Stochastic Neighbor Embedding technique (t-NSE).

RESULTS

The analysis according to the proposed approach revealed that the Supreme Court justices produced a significant number of similar decisions.

Despite the recent movement to adopt new textual contents, the standardization was still present in the years studied, although with less intensity than previously.

Besides this, the use of standardized decisions had a direct impact on the workload of each justice. The justices who issued more repetitive decisions were those with the largest case load. This strengthens the idea that writing similar decisions is a strategy to deal with the huge case load.

The justices were more repetitive in years with a larger number of cases, and there were indications that the decisions tended to become more repetitive as justices' tenure increased.

WHAT'S NEW

Until now, no study had quantitatively and systematically evaluated the content of the huge number of decisions issued by the STF to discover to what extent the justices use standardization as a way to deal with their large caseloads.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

One possible application is to verify whether the similarity commonly occurs in specific parts of decisions. In future works, we intend to use an approach based on the Word Movers' Distance method (WMD), which allows evaluating the "distance" between two documents even when they do not have any words in common.

We also intend to explore the similarities between the individual decisions of different judges, to verify which ones tend to reuse each other's decisions, to indicate connections between members of the Supreme Court.

THE TAX BARRIERS TO DONATIONS TO CIVIL SOCIETY ORGANIZATIONS IN BRAZIL

In recent decades, civil society organizations (CSOs) have played an important role in Brazil to guarantee and affirm rights. However, their sustainability has been threatened by low capacity to generate their own resources, the fragility of financing mechanisms and a scenario of legal uncertainty in the relationship with the State. This study brings arguments in support of eliminating tax barriers to donations to CSOs by means of improvement of legislation on the Tax on Causa Mortis Transmission and Donation (ITCMD).

OBJECTIVE

- To obtain a broad view of the taxation of donations to CSOs from a compared perspective and in the Brazilian experience (both legislative and jurisprudential), as well as to provide economic data for Brazil. Besides this diagnosis, the study also includes recommendations for improvements in the legal handling of this subject in Brazil.

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Apoio:
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RESEARCH METHODOLOGY

A database was gathered with data on the taxation of inheritances and donations of 75 countries, selected according to availability of data, covering all continents.

Two other public databases were structured and analyzed: one containing laws, decrees and other normative acts related to ITCMD of each of the 26 Brazilian states and the Federal District; and the other a systematized matrix of the main information regarding this legislation.

We also searched for and analyzed decisions issued by the Federal Supreme Court (STF) and Superior Tribunal of justice (STJ, the highest court for non-constitutional matters) regarding ITCMD, since the promulgation of the Federal Constitution of 1988. We sought to identify which aspects (directly or indirectly) related to this tax were considered by the two courts and what positions were established.

Finally, we arranged information related to revenues from ITCMD, with analysis of data from 10 states that disclose the amount of revenue obtained from the ITCMD assessed on donations by legal entities in 2016 and six states in 2017.

RESULTS

The international experience suggests that the Brazilian system of taxing inheritances and donations has two intrinsic mistakes: we undercharge those that should be taxed more (persons with greater wealth in the case of bequests and donations of private interest) and overcharge those that simply should not suffer taxation (CSOs, in the case of donations).

Since the ITCMD is a tax paid to state coffers, the various laws vary greatly from state to state. This is aggravated by the absence so far of a federal complementary (enabling) law on the minimum and maximum rates that can be assessed, so as to more closely harmonize treatment throughout the country.

In this context, it is hard for a CSO that wants to be sure it is strictly complying with the rules on ITCMD. This applies both to CSOs that need to pay the tax and those benefited with constitutional immunity or some other type of state exemption, especially in the case of interstate donations. In a setting of legal uncertainty, the costs of satisfying all the complex legal parameters are often simply too great.

The decisions of the STF and STJ on this question are clearly limited, which is revealed in two main aspects: i) a large number of decisions not judging the merit of the case due to procedural impediments; and ii) sparse foundations of the decisions addressing the merit, mainly those of the STJ. But in general, the tendency, especially of the STF, is to assure effectiveness of the immunity of social assistance and educational institutions, by as broad an interpretation as possible.

The low availability of open public data on the ITCMD hamper the understanding of the "profile" of the associated revenue – the relative weights of inheritances and donations, for example, as well as the participation of individuals and legal entities in the payment of taxes on donations.

The amount of ITCMD obtained from donations to legal entities (which includes CSOs) represents a very small portion of the state's tax revenues. In simulations carried out with three states (São Paulo, Paraná and Mato Grosso do Sul), possible recomposition of the revenue forgone from ITCMD on donations to legal entities would require adjustments below 0.09 percentage point in the rates assessed today on transmission *causa mortis*.

Based on this observation, it can be assumed that expansion of tax immunity and exemption applied to donations to CSOs (in comparison with what happens today) would not produce relevant fiscal effects.

In summary, the taxation of donations to CSOs in Brazil differs from international practices, creates an environment of legal uncertainty to organizations and does not generate relevant revenue to compose the state budgets. It can thus be described as an anachronism of the Brazilian taxation system.

WHAT'S NEW

The study is an innovative academic initiative that seeks to meet the demands of CSOs, governments and companies for production of data, analysis and proposals, in a scenario where little attention is being paid to the subject.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The results of the study can serve as support for public debate about the legal treatment given to the ITCMD in the country, and help efforts to improve the legislation, a pressing task in Brazil.

The results can also support advocacy in favor of bureaucratic simplification and the debate about cases of immunity or exemption, given the public character of the donees.

Two questions not addressed in the study deserve future research: (i) Where does the burden rest to prove the requirements for exercise of immunity: the CSO or the tax authority?; and (ii) Is it legitimate to require prior administrative recognition for the purpose of enjoying tax immunity?

DO DISAGGREGATED DATABASES HELP EXPLAIN BRAZILIAN INFLATION?

The use of disaggregated data to forecast inflation, in theory, can improve the predictive power over various horizons in relation to models that only use aggregated data. This study employs information from databases of the FGV's Brazilian Institute of Economics (FGV IBRE) to evaluate whether the use of disaggregated data and large databases brings additional gains to explain inflation, as measured by the Consumer Price Index (IPCA).

OBJECTIVE

- Analyze the explanatory power for inflation by synthesizing information from public databases plus the IBRE to evaluate the possible gains in explaining the IPCA.

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Apoio:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV)

RESEARCH METHODOLOGY

The analysis covers two types of databases kept by the IBRE: the public one (which includes 31 variables); and the expanded one (with a total of 8,007 variables), which besides public data, contains restricted data that require paying a subscription fee to access.

We considered all the variables starting up to January 2000. Besides this, we included all the variables with data up to December 2018.

The number of factors extracted from each database was determined using the procedure described by Bai and Ng ("Determining the number of factors in approximate factor models", *Econometrica*, 70 (1):191–221, January 2002), resulting in six factors from the public database and 15 factors from the expanded database.

The factors were extracted from three different datasets, containing: (i) only public data; (ii) only restricted data; and (iii) a combination of public and restricted data.

Mainly due to the large number of variables present in the part of the database with restricted data, it was necessary to reduce the dimensionality. We used a factor model, which is useful when variables contain common components, as in the case of this study.

The factors extracted were used as variables to explain inflation measured by the IPCA. From the initial set of variables, which was ample, we selected a subset that was relevant to explain the evolution of inflation. The algorithm used for data selection was given by Autometrics, developed by Doornik and Hendry ("PcGive 13", Timberlake Consultants Press, 2009). This algorithm allows to detect outliers and structural breaks. The estimated model has a dynamic structure of the dependent and independent variables.

RESULTS

The factors extracted from the public database brought gains to explain inflation in relation to an autoregressive model.

However, the use of factors linked to the restricted database led to even greater gains of the power to explain inflation compared to the model only with factors extracted from the public database of the autoregressive model. The model using only the public database also presented gains in relation to the autoregressive model.

This gain in the power to explain inflation when using factors extracted from the restricted database was about 3 percentage points better than using only factors from the public database. In other words, it was possible to explain about 75% of variations in inflation with use of factors extracted from the public and restricted databases.

WHAT'S NEW

Evidence exists that disaggregated models improve the predictive power in relation to those that only use aggregated data. This has already been the topic of research for the IPCA, but only public data were used. This study tries, for the first time, to examine the interaction between restricted IBRE data and the data from the IPCA.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The obtainment of models to predict inflation using aggregated and disaggregated data from IBRE price indices, as is the case of this study, can enable the creation of tools to be used by economic agents like government agencies, banks and other private institutions to improve predictions of these important Brazilian economic indices.

A wide avenue for future research exists. A natural extension of this work would be to simulate the out-of-sample predictive performance of the cited bases. As more indicators are made available in the sample, new prediction models would be estimated and their performance evaluated. In this exercise the gain would be simulated by using bases in real time. Another possible extension would be to use the base to estimate indicators of economic activity such as Brazilian GDP and industrial output. Finally, a large number of econometric techniques can be applied to construct prediction models and evaluate which perform best based on IBRE databases. This can help market analysts to extract the full potential of the base, providing a guide on how to use these data.

EVALUATION OF THE IMPACT OF THE PUBLIC DIGITAL BOOKKEEPING SYSTEM (SPED)/ELECTRONIC INVOICE (NF-E)

The adoption of the Public Digital Bookkeeping System (SPED) in Brazil, particularly the Electronic Invoice (NF-e), has enabled tax authorities to obtain real time information on taxpayers and their transactions. This study takes advantage of the variation of adhesion to the SPED in sectors/states over time to analyze the fiscal and economic impacts of their implementation.

OBJECTIVE

- To investigate the impacts of the introduction of the Public Digital Bookkeeping System (SPED) – with emphasis on the Electronic Invoice (NF-e) – on the variables that reflect the added value recorded by companies, tax revenues generated and the dynamics of the formal labor market.

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Applied Research Fund of Fundação Getulio Vargas (FPA FGV), Secretariat of Revenue and Planning of the State of São Paulo (SEFAZ/SP) and Inter-American Development Bank (IDB)

RESEARCH METHODOLOGY

Employing an exclusive panel dataset at the level of sectors of economic activity (5-digit CNAE codes) for 10 states, provided by the local tax authorities, and data from the Annual List of Social Information (RAIS, submitted by companies to the Ministry of the Economy), empirical strategies were applied by the difference-in-differences method and an event study was conducted to examine the effects of implementing the NF-e in different sectors and states with different timing.

The final dataset was consolidated in a panel structured by CNAE Sector – State – Year/Month, covering the period from January 2002 to December 2018. After this consolidation, new variables were constructed: i) sales; ii) purchases; iii) fiscal debits; iv) fiscal credits; and v) total value added (sum of the values of the firms that adhered to the NF-e with the values of the firms that did not adhere).

The effects of implementing the NF-e are measured by two variables: i) monetary adhesion, which corresponds to the proportion of sales recorded by firms that already adhered to the NF-e in the reference month; and ii) a dummy variable of adhesion that assumes value 1 in the first month in which the CNAE Sector of a state presents sales values of firms adherent to the NF-e and zero otherwise. All the monetary variables were adjusted for inflation, transformed into constant values (base year 2018) and converted into six-month moving averages to deal with the question of economic seasonality.

RESULTS

The advent of the NF-e had a positive effect on all the fiscal dimensions considered in the study – there were statistically significant increases of fiscal debits, fiscal credits and tax revenue. But these results should be interpreted with caution because there is evidence for some of them that their trends before implementation of the NF-e were not similar.

An indirect effect of implementing the NF-e was increased formalization of the economy as a whole. This result is more robust because it is not possible to reject the hypothesis of similar trends among the sectors before implementation of the NF-e.

The number of workers expanded with a similar magnitude as the total labor earnings, with no positive variations of mean real wages. The possible gains were restricted to administrative activities, which do not appear in a global analysis as carried out in this study. The inspection of the effects during the years following the entry of the NF-e suggests they occur from one to two years afterward, and cease being relevant as of the third year.

In relation to total purchases, total sales and value added, the results suggest that the behavior of these variables in the period before adhesion was different among the sectors that adhered to the program, in turn suggesting caution in causal interpretation of the results, since a positive association exists between the advent of the NF-e and the values of those variables, both for Brazil as a whole and for each state separately.

WHAT'S NEW

Various studies of Latin American countries have indicated positive effects resulting from the implementation of instruments similar to the Electronic Invoice (NF-e). This is the first study to evaluate the fiscal and economic impacts of the adoption of the NF-e in Brazil.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The adoption of the Public Digital Bookkeeping System – in particular the NF-e – was the main administrative innovation in public finance implemented in Brazil in recent years. It permits the tax authorities to obtain information about taxpayers and their transactions in real time, while also reducing transaction costs of firms to comply with tax obligations.

A contribution of this study is precisely to show the state tax authorities themselves how to use the data generated by the NF-e. Curiously, despite the potential of the NF-e for planning and management of taxing policies, the richness of this information has been relatively underused by the State Revenue Secretariats (SEFAZs) for planning purposes. Its use has been largely restricted to oversight and auditing. Evidence in this respect is provided by the difficulty of the SEFAZs to generate the dataset requested for this study. Various secretariats indicated inability to generate that information even though it was available.

Considering the gains estimated in this study, plus the indirect effect the increase of formalization, which in turn increased tax revenues on income, the return of this policy appears to be highly positive. The task now is to find ways to innovate fiscal and tax management of the states to continue obtaining returns in this area.

MINING JAMS INTO POLLUTION: HOW WAZE DATA HELP ESTIMATING AIR POLLUTION INLARGE CITIES

Air pollution has been a growing worry of international medical organizations and governments due to its relation with a large number of respiratory diseases, among other effects. This work proposes an open, crowdsourced, scalable methodology to model spatial air pollution in cities worldwide. This methodology is used to estimate the air quality in Montevideo, Uruguay, using as a proxy the city of Oakland, CA, in the United States, and to observe adherence to what is expected in practice.

OBJECTIVE

- To propose an open, crowdsourced, scalable methodology to model spatial air pollution in cities worldwide.

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Master's Program in Mathematical Modeling of the School of Applied Mathematics (EMAp)

RESEARCH METHODOLOGY

The study uses data from Waze and OSM to build a set of features designed to model vehicle emissions in large cities. Waze data provide information about all congested road segments in a region every two minutes, and OSM is an open source database, detailed and dynamically updated, of the mapped characteristics. The data are aggregated in a hexagonal mesh covering the region, obtained from the H3 base of Uber.

The mathematical model is calibrated using data from an area of 30 km2 in Oakland, California, USA. The dependent variables are the annual concentration of fine particles of black carbon (BC), nitric oxide (NO) and nitrogen dioxide NO2.

Pollution data were collected in 2015 and 2016, while Waze data are from March 2019. Based on other studies, we assumed that traffic patterns did not change significantly between these periods.

Finally, the model is extrapolated to Montevideo, Uruguay, and in practice adherence to what is expected is observed.

RESULTS

Air pollution is closely related to the presence of expressways and streets with large flows of vehicles, mainly emitting BC and NO. The relationship between the decay of the concentration of pollutants and the distance to these roads, dictated by the interaction of the pollutants with atmospheric factors, drastically alters the distribution of pollutants in the hexagons of the map. NO2 is more uniformly distributed than BC and NO. On the other hand, BC and NO, which decay faster with distance, are distributed irregularly, depending on vehicular traffic on the roads in question. These distinct patterns of behavior were observed and mapped.

Land use regression (LUR) models are used for modeling surface air pollution using both land use information (farm, urban area, etc.) and geographic predictors (latitude, altitude, distance to sea, etc.). Results suggest that traffic data from Waze and OSM are good candidates as predictors in LUR models, which are often not replicable across regions.

WHAT'S NEW

Due to its simplicity, the model can be improved in various ways. For instance, one can investigate other features constructed using both Waze and OSM data, or experiment with different versions of the model.

The study opens a new path to deal with the transferability problem of the LUR model, i.e., it applies the knowledge learned in one city to others. Traditionally, the predictor variables have been highly localized and not standardized, preventing model extrapolation to other regions. The databases used are available for the majority of cities in the world and are adequately maintained and updated.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The use of the proposed method enables planners in cities undergoing rapid development, with little or no air quality metrics, to obtain this information at low cost compared to the installation of sensors.

Projects like OpenAQ compile air quality data from more than 10 thousand locations. Most of the datasets are from sparse fixed monitors of air concentration. But, due to the large number of different locations, standard LUR models can be trained using only Waze and Open Street Maps features. In this way, the lack of high resolution data is compensated by the volume of different locations. Different validation settings can take place, using entire cities as validation sets. This might be a solution to the transferability problem and a way to establish a global intra--urban air pollution estimation method.

Different validation scenarios can be adopted, using datasets from entire cities for validation. This could be a solution to the transferability problem and a way to construct a global method to estimate urban air pollution.

Finally, the study can be applied for the development and evaluation of health policies in large cities. Demographic data, bus routes and origin-destination data can help understand the population flow in the city. By combining this information with air pollution, one may estimate its impact on the population's health.

MONEY, ELECTIONS AND CANDIDATES

A consensus exists among researchers that in Brazilian elections, the candidate that spends the most tends to receive the most votes – but not regarding what type of candidate or party benefits the most from election spending. This uncertainty can be explained by the narrow scope of the data and the absence of comparisons over time and between regions. To help fill this gap, this study presents descriptive statistics that explore the temporal and spatial variation of campaign spending of the candidates who were victorious in elections for the Chamber of Deputies (the lower house of Brazil's Congress).

OBJECTIVE

- To analyze the evolution of election spending of candidates for the Chamber of Deputies in the four elections held in Brazil from 2002 to 2014.

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Applied Research Fund of Fundação Getulio Vargas (FPA FGV), São Paulo State Research Support Foundation (FAPESP) and Brava Foundation

RESEARCH METHODOLOGY

The election spending data analyzed refer to the four general elections in Brazil held between 2004 and 2014. Every four years, elections are held for Congress (Chamber of Deputies and Senate), president/vice president, governors and state legislators, while mayors and municipal council members are also elected every four years, with the elections for national and statewide offices being staggered with those for local offices. All the data utilized were supplied by the Superior Electoral Tribunal (*Tribunal Superior Eleitoral, TSE*), which has systematically recorded national campaign spending since 2002.

Modifications were made in the TSE data to assure compatibility over time and to transform the values from Brazilian currency (the real, plural reais, R$) to American dollars. The data were first deflated to reais of December 2016 using the National Comprehensive Consumer Price Index (IPCA) estimated by the Brazilian Institute of Geography and Statistics (IBGE), and then were converted to U.S. dollars using the average exchange rate of each month.

The following comparative tables were organized:

- Average campaign spending of all elected candidates (federal deputies, senators, state governors and presidents);
- Average campaign spending of presidents elected (in this case from 1994 to 2014);

Only for federal deputies:

- Average campaign spending of elected candidates;
- Average campaign spending of candidates not elected;
- Average campaign spending of candidates considered to have high quality, which includes elected candidates and a selected group of non-elected candidates (whose vote tallies were at most 10% lower than the last candidate elected from the respective party slate);
- Gini index of the concentration of spending by candidates;
- Average campaign spending of candidates elected from the seven most traditional parties;
- Average campaign spending of elected candidates broken down by state.

RESULTS

Corroborating previous studies, the results showed that campaign spending is an essential tool for the success of candidates for political offices in Brazil.

The spending of all candidates for federal deputy increased by 51.4% in the period studied, and for elected candidates it grew by 227% – i.e., the ratio between the campaign spending of elected and non-elected candidates rose from 6.4 in 2002 to 16.4 in 2014.

The number of "high quality" candidates not elected – those that attained at least 90% of the votes of the last one elected on the respective party list – was on average 60.

Considering these candidates plus the 513 elected ones suggests that elections for Chamber of Deputies have been much less competitive than expected, considering the total number of candidates per seat, which varied from 9.5 to 16.5.

The spending of both groups of high-quality candidates was far above that of the candidates not elected, demonstrating the association between money and the number of votes in Brazilian elections.

Important variations were found among states and within each state, suggesting that the magnitude of the electoral district and regional characteristics have limited influence on spending.

Aggregation of candidates by party suggested a complex situation that cannot be explained by the traditional government-opposition dichotomy.

WHAT'S NEW

The influence of money on electoral performance was confirmed by the unquestionable relationship between the highest-spending candidates and those elected. Although a campaign that spends a lot does not assure election, this appears to be a characteristic shared by high-quality candidates, since the campaign spending was concentrated in a small group of candidates during the entire period studied.

These conclusions cast doubt on the assumption that a large number of candidates automatically translates into more intense competition. In other words, the elections for the Chamber of Deputies are less competitive than the existing literature has predicted.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

Our findings open a new agenda for research into the costs of Brazilian elections.

First, since the campaign spending did not undergo any discernible impact of the magnitude or the electoral districts, new comparative studies are necessary to establish the relationship between size of the district and campaign spending.

Second, as argued by Samuels ("Money, Elections, and Democracy in Brazil." *Latin American Politics and Society* 43(2): 27-48), candidates are stimulated to increase their campaign spending not by the sheer number of competitors, but rather by the number of high-quality competitors on the list of their party, as determined by the results of past elections. The rule adopted in this study to define high-quality candidates is perhaps extreme. But the choice of an adequate rule for selection depends on knowing the real level of competition. The choice of a rule for adequate selection in proportional elections is a topic that needs further research.

Campaign spending in this study was treated as an aggregate, but the reports of candidates to the TSE allow detailed discrimination of the types of spending. These data can, for example, allow investigation about whether some types of spending are more effective than others and in what context these differences occur.

ORAL HISTORY OF THE 40 YEARS OF THE SECURITIES COMMISSION

Motivated by the fortieth anniversary of the creation of Brazilian Securities Exchange Commission (CVM), this research project proposed a new scientific discourse about the CVM: comprehend the institution's history according to the narrative of its former chairpersons, to mine the memory, trajectory and versions of these actors in relation to the period they presided over the institution.

OBJECTIVE

- To tell the history of the Brazilian Securities Exchange Commission (CVM) by means of interviews with its former chairpersons, with the purpose of understanding the institution's trajectory since its creation, as well as its participation in the development and regulation of the capital market in Brazil.

Authors:
Izabel Nuñez and Paulo Augusto Franco

Researcher:
Antônio José Matristrello Porto

Organization:
Rio de Janeiro Law School (Direito Rio)

Apoio:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV) and the Brazilian Securities Commission (CVM)

RESEARCH METHODOLOGY

Oral history can be thought of as a hybrid genus of investigation that encompasses articulations among individual trajectories, institutional history and national history.

By means of the source-technique method of oral history, the goal is to treat the target institution as a dual exercise of incorporation: both the individual in the institution and the institution in the individual.

Interviews were conducted in which we sought to relate the personal paths of the former CVM chairpersons with its formation and structuring process, with attention to studying the contextual aspects of Brazil and the world in each period analyzed.

To guide the interviews, we prepared general scripts, with reference to national and international episodes, from 1940 to 2000, focusing on Brazilian and the institution's history, especially in the areas of economics and law.

The individual profiles of the respondents were produced from information on their backgrounds available to the public, such as websites and books.

The interviews were recorded on video and audio and the words were transcribed and submitted for standard processing, according to the method of the Oral History Program developed and applied by FGV CPDOC (Center for Research and Documentation of Contemporary History of Brazil): such as verification of fidelity, standardization of interviews and summaries preparation.

RESULTS

The narratives produced through the interviews with the former chairpersons of the CVM demonstrated intense relations between the personal spheres – i.e., regarding aspects of social formation and professional training of individuals – and the context of the period, expressed not only by the CVM, but also by the market, government, society, and the wider world.

Besides the history of CVM itself, the study of the history of Brazilian economic and political thinking, especially bearing in mind the need to confer intelligibility to the so-called major social processes, in search for the diversities subsumed in the catalytic logic of large concepts like "the market" and "the law".

WHAT'S NEW

The reconstitution of Brazilian Securities Exchange Commission through descriptions of its former chairpersons, besides following its institutional route, sheds light on the development of relations in the country's securities market beyond the formal historical records, enriching the CVM historical framework.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

The research engendered the publication of the book, *A invenção do mercado de capitais no Brasil: a formação da CVM segundo seus primeiros presidentes* (1976-1988) ["The invention of the capital market in Brazil: The formation of the CVM according to its first chairpersons"], by Izabel Saenger Nuñez and Paulo Augusto Franco.

All the information gathered in the study is available on the FGV CPDOC website, in the scope of the Oral History Program. The audio and video recordings of the interviews are also part of the school's repository.

The products of the study can be utilized in particular by students who are pursuing a Master's Degree in the Law of Regulation at FGV Direito Rio, besides being of general interest to society and having a large impact on the practice of business law in general. Additionally, these products can serve as the base for discussion about a new Commercial Code and reform of the Law of Corporations.

QUARTERLY PRODUCTIVITY OF THE BRAZILIAN ECONOMY

With the end of the demographic bonus, the only way to increase per capita income in Brazil in the coming decades will be by increasing average worker productivity. This study provides an important contribution to understand the evolution of Brazilian productivity, by constructing, for the first time, quarterly indicators of aggregate and sectoral productivity.

Authors:
Fernando Veloso, Silvia Matos and Paulo Peruchetti

Organization:
Brazilian Institute of Economics (IBRE)

Support:
Applied Research Fund of Fundação Getulio Vargas (FPA FGV)

OBJECTIVE

- To construct a quarterly series of productivity indicators for Brazil using as measures of labor input for the employed population and the number of hours worked.

RESEARCH METHODOLOGY

We constructed a quarterly series productivity indicators for Brazil from the first quarter of 2012 to the last quarter with available information.

We calculated labor productivity measures for the aggregate of the economy for three main economic sectors (agriculture, industry and services) and their subsectors.

The productivity indicators were calculated using two measures of the labor factor: employed population and number of hours worked. The second measure was chosen because during the economic cycle the hours worked can vary, which affects the productivity indicators of employed workers.

Productivity per occupied persons was defined as the result of dividing the value added at 2016 prices of a determined activity in a particular year by the occupied population in the same year. In the productivity per hour worked metric, the divisor was the total number of hours worked in the activity in the same period.

The data on value added for the aggregate production and that of the 12 sectors of the Brazilian economy were obtained from the Quarterly National Accounts – which are integrated in the National Accounts – reference 2010, of the Brazilian Institute of Geography and Statistics (IBGE).

The data on employed population and number of hours worked in all occupations were extracted from the Continuous National Household Survey (Continuous PNAD).

RESULTS

The trajectory of quarterly labor productivity in Brazil has been very disappointing. The productivity level is still very low by international standards, and its growth in 2018 and 2019, although better than in 2015 (period of largest decline), was still negative.

After a sharp decline in 2015, productivity per employed person experienced a recovery in the three large economic sectors and the economy as a whole between the second quarter of 2016 and the second quarter of 2017. However, the shows that since then there has been of a deceleration of the growth rate of aggregate productivity.

The cumulative labor productivity in four quarters, which had been recovering since 2016, suffered a decline of 0.9% in the fourth quarter of 2019, when calculated per occupied worker, and 1.0% when considering the average productivity per hours worked.

Of particular note was the weak performance of labor productivity in the service sector, which when measured both per employed person and by hours worked, has been falling since 2014. Since this sector concentrates about 70% of the employed population and of the hours worked, this finding helps understand why labor productivity has made little progress in recent years.

WHAT'S NEW

Although there are estimates of labor productivity with yearly frequency in Brazil, before this study there was no public information with quarterly frequency. The aim of this study was to fill this gap.

APPLICATIONS OF THE RESULTS AND POSSIBLE EXTENSIONS OF THE STUDY

With the end of the demographic bonus, the only way to increase per capita income in Brazil in the coming decades will be by increasing average worker productivity. Therefore, discussions about the theme of productivity have been gaining importance among researchers and economic policymakers, and describing its evolution over time can make a valuable contribution to the public debate on this theme.

The construction of quarterly indicators of the 12 main sectors of the economy helps to understand the sectoral dynamics of productivity during economic cycles and can serve to support the formulation of public policies.

FGV IN 2020

Seventy-six years ago, Fundação Getulio Vargas was born with the goal of stimulating Brazil's socioeconomic development by training qualified administrators in the public and private sectors. Over time, it expanded its activities to other fields of study and it has always been recognized for its quality and excellence in producing and disseminating knowledge.

As an education leader in Brazil and abroad, through its undergraduate and graduate programs, FGV has a vast educational portfolio in various areas, such as public and business administration, economics, law, the humanities, data science, international relations and applied mathematics.

In 2020, a year marked by the great COVID-19 pandemic, which generated numerous consequences for humanity, FGV was able in a short space of time to face the needs imposed by this global emergency.

When social distancing rules were brought in, face-to-face programs were replaced with live videoconference classes. As a result, FGV remained present in more than 100 municipalities across Brazil, in addition to its main centers in Rio de Janeiro, Sao Paulo and Brasilia. The methodology adopted was synchronous classes using modern technology combined with online materials.

The institution also conducted its entrance exams and other selection processes completely online, ensuring the safety of candidates and following the recommendations of the health authorities. In addition, it began to hold virtual events in order to continue to strengthen the exchange of knowledge with the general public. The webinars held by FGV took place daily, online and free of charge.

In the context of this widespread use of technological instruments, FGV has been following a path of digital transformation, building on gradual work in line with global technology developments and investment over the years. Faced with an unpredictable and unusual situation, FGV moved quickly, but this was only possible thanks to its previous continuous work, whose impact can be seen in the organization's results.

For more information, go to fgv.br/portal

2020

- Ranked world's third best think tank and the leader in Latin America in the 2020 Global Go To Think Tank Index Report, published by the University of Pennsylvania
- For the second time, ranked among the companies that best communicate with journalists by Negócios da Comunicação magazine
- World's first education institution to have 2 million LinkedIn followers
- Total of 53,500 executive education, undergraduate, master's and doctoral students having live synchronous classes, via technology
- Approximately 800 professors on undergraduate, master's and doctoral courses trained in a week
- More than 1,800 employees using technology platforms to work safely from home

FUNDAÇÃO GETULIO VARGAS (FGV)

President:
Carlos Ivan Simonsen Leal
Vice presidents:
Francisco Oswaldo Neves Dornelles (on leave)
Marcos Cintra Cavalcanti de Albuquerque

FGV IN NUMBERS

Data referring to 2020.

3,745
academic publications by professors, researchers and technicians.

948
events organized and jointly organized.

326
studies and research projects concluded.

561
technical consulting projects.

136
books published.

99,155
executive and continuing education students.

5,488
undergraduate students.

2,426
master's students.

488
doctoral students.

SOCIAL NETWORKS

Data referring to 2020.

3,731,670
Total number of followers.

918,911
Total engagement in official social networks.

45,623
Total posts in institutional social media .

313,152
Hours of videos watched on YouTube.

5,517
Total videos on YouTube.

659,290
Total new followers in social media.

609,661,340
Total reach of posts on official channels.

AREAS OF ACTIVITY

FGV is an institution that operates in multiple areas and it has an extensive organizational structure.

Learn about FGV's different areas of activity:

TOP MANAGEMENT

- **General Assembly**
- **Board of Trustees**
- **Board of Directors**
- **President**
- **Vice Presidents**
- **Office of the Provost for Education, Research and Graduate Studies**

SERVICES, INDEXES AND PUBLICATIONS

- **FGV Knowledge**
- **FGV Press**
- **FGV Europe**
- **IBRE**
  Brazilian Institute of Economics
- **FGV Projetos**

EDUCATION AND RESEARCH

- **CPDOC**
  School of Social Sciences
- **Direito Rio**
  Rio de Janeiro Law School
- **Direito SP**
  Sao Paulo Law School
- **EAESP**
  Sao Paulo School of Business Administration
- **EBAPE**
  Brazilian School of Public and Business Administration
- **EESP**
  Sao Paulo School of Economics
- **EMAp**
  School of Applied Mathematics
- **EPGE**
  EPGE Brazilian School of Economics and Finance
- **EPPG**
  School of Public Policy and Government
- **IDE**
  Institute for Educational Development
- **IDT**
  Institute for Technological Development
- **RI**
  School of International Relations
- **Research Network**
  Applied Research and Knowledge Network

GENERAL ADMINISTRATION

- **ASDI**
  Institutional Development Area
- **DCI**
  Internal Control Division
- **DICOM**
  Communications and Marketing Division
- **DINT**
  International Affairs Division
- **DO**
  Division of Operations
- **DRH**
  Human Resources Division
- **SB and NDOc**
  Library System and Documentation Center
- **Audit Superintendent's Office**
- **Controllership Superintendent´s Office**
- **Treasury**

SPECIAL PROGRAMS

- **Chamber**
  Chamber FGV of Mediation & Arbitration
- **CDMC**
  Center for the Development of Mathematics and Science
- **CERI**
  Center for Regulation and Infrastructure Studies
- **Growth and Development**
  Center for Economic Growth and Development Studies
- **DAPP**
  Department of Public Policy Analysis
- **DGPE**
  Center for the Development of Public Management and Educational Policy
- **Energy**
  Center for Energy Studies
- **Secondary Education**
- **NPII**
  International Intelligence Unit
- **Social**
  Center for Social Policy
- **Transportes**
  Center for Transport, Logistics and Urban Mobility Studies

2020

- Historical archives containing more than 2 million handwritten, printed and audiovisual materials.
- More than 7,800 entries in *Dicionário Histórico--Biográfico Brasileiro.*
- 66 undergraduate students.
- 40 academic master's students.
- 58 professional master's students.
- 68 academic doctoral students.

CPDOC

SCHOOL OF SOCIAL SCIENCES

DEAN: CELSO CASTRO

The Center for Research and Documentation in Contemporary Brazilian History (CPDOC) was founded in 1973 with the goal of safeguarding and producing documentary sources of importance to the country's history. In 2005, CPDOC expanded into education and it was renamed the FGV School of Social Sciences.

The school now offers bachelor's degrees in the humanities and international relations, as well as graduate programs (both degree and non-degree), designed to contribute to a better understanding of social reality, especially with regard to processes and topics of relevance to Brazil and its participation on the global stage.

In 2020, CPDOC accompanied FGV's digital transformation. The team transformed 100% of its administrative processes into digital ones, optimizing internal routines. In addition, technology allowed us to expand our graduate selection processes across Brazil, including the launch of our professional doctorate, which resulted in almost 600 registered candidates in all regions of the country.

For more information, visit fgv.br/cpdoc

DIREITO RIO

RIO DE JANEIRO LAW SCHOOL

DEAN: SÉRGIO GUERRA

The FGV Rio de Janeiro Law School was founded in 2002 with the goal of innovating in legal education, research, teaching and curricula. Its overriding purpose is to contribute to the development of leaders to think about Brazil in the long term.

A leader in legal education and research, the school provides academic and executive education to professionals, helping them develop public and private sector careers. It is also a pioneer in its fields of activity, having created the first master's in regulatory law in the country.

The school works in multiple areas, including undergraduate, graduate and executive education courses.

In 2020, the Rio de Janeiro Law School accompanied FGV's digital transformation, remotely performing a series of significant academic activities. In addition to continuing with its undergraduate, graduate and executive education programs through virtual teaching platforms, the school's Graduate Law Program, in partnership with the FGV Sao Paulo Law School, held a series of webinars featuring leading academics from Brazil and other countries, as well as representatives of government and civil society. In all, 13 meetings were held to discuss and formulate diagnoses, and to develop solutions to the legal problems currently faced by the Brazilian state and by society as a whole. Likewise, building on a long-standing partnership with the Chicago Law School, FGV's Rio de Janeiro and Sao Paulo law schools held the First Chicago-FGV Forum in Law & Economics. The content of this online event was made available to interested parties free of charge, as part of the school's constant drive to generate public goods to assist Brazil's development.

For more information, visit fgv.br/direitorio

2020

- Exchange agreements with 60 renowned foreign universities, including Harvard, Yale, Columbia and NYU.
- 288 undergraduate students.
- 42 master's students.
- 6 doctoral students.

2020

- Cooperation agreements with more than 40 international research and higher education institutions.
- 387 undergraduate students.
- 354 academic and professional master's students.
- 13 academic doctoral students.

DIREITO SP

SAO PAULO LAW SCHOOL

DEAN: OSCAR VILHENA VIEIRA

The Sao Paulo Law School was founded in 2002 to train a new generation of legal experts qualified to meet the challenging demands of contemporary society. The school has an innovative educational approach, preparing its students to work in the public and private sectors, through constant dialogue with other fields of knowledge. It is committed to the development of new competencies and skills, as well as mastery of new technologies that have been affecting the legal profession.

The school offers undergraduate, professional master's, academic master's, doctoral and non-degree graduate programs in areas such as business law, tax law and intellectual property.

In 2020, the Sao Paulo Law School accompanied FGV's digital transformation. In particular, its Center for Education and Research in Innovation (CEPI) not only prepared professors and researchers for online participatory teaching, but also offered training to other FGV schools and held events and workshops on virtual participatory teaching throughout 2020, in order to guide other institutions on different participatory teaching activities in the virtual environment. Likewise, studies were initiated to guide the resumption of in-person classes and to structure the school to provide an appropriate education for the future after COVID-19. It is also noteworthy that, despite the lack of international mobility, the school managed to carry out various online initiatives with partner schools, promoting the integration of professors, students and employees, including student exchange activities.

For more information, visit fgv.br/direitosp

EAESP

SAO PAULO SCHOOL OF BUSINESS ADMINISTRATION

DEAN: LUIZ ARTUR LEDUR BRITO

Established in 1954, EAESP is the most international school in Latin America, with more than 100 partnerships with renowned institutions in other countries on all continents. It is also recognized as a center for high-level research on administration and leadership education in the corporate, governmental and academic spheres.

It is one of a handful of business schools in the world and the first in Brazil to possess triple international accreditation, from the Association to Advance Collegiate Schools of Business (AACSB), European Foundation for Management Development (EFMD) and Association of MBAs (AMBA).

The school offers undergraduate courses in business administration and public administration, executive education programs, master's degrees, and academic and professional doctorates. Some of its courses are taught entirely in English.

In 2020, in addition to basic actions during the pandemic, such as classes, remote seminars and telecommuting, EAESP accompanied FGV's digital transformation, training its professors to teach remotely, reflecting on issues such as pedagogical aspects of distance education, technological tools and online class etiquette. EAESP also trained its employees to make better use of the Teams tool, aimed at facilitating communication and promoting collaboration between people and teams at the school.

For more information, visit fgv.br/eaesp

2020

- Rated the best business school in Brazil in 2020 Eduniversal ranking.
- 2,505 undergraduate students.
- 691 master's students.
- 246 doctoral students.
- 235 specialized course students.

2020

- EFMD renewed the school's accreditation, attesting to its international excellence.
- 36 new in-person undergraduate students.
- 133 new master's students.
- 8 new doctoral students.

EBAPE

BRAZILIAN SCHOOL OF PUBLIC AND BUSINESS ADMINISTRATION

DEAN: FLAVIO VASCONCELOS

Established in 1952, EBAPE has the goal of producing and disseminating knowledge, as well as promoting research and the development of professionals qualified to work in leadership positions in business, the public sector and academia. It was the first business school in Brazil and Latin America.

EBAPE offers administration courses at undergraduate level (distance and in-person), professional master's programs in public administration and business administration, and academic master's and doctoral programs. Some of its programs are taught entirely in English, including its master's and doctorate programs, Master in Management (MiM), Double Degree with Lisbon Catholic University and International Master's Program in Practicing Management (IMPM). It has EQUIS-EFMD and AACSB international accreditations, as well as dozens of strategic and student exchange partnerships.

In 2020, an academic management system was implemented for all FGV EBAPE's graduate courses, resulting in transparency in academic processes and allowing the school to improve its management of indicators of excellence in graduate education. It also held more than 50 online events, sharing knowledge, promoting debates and reflections on important topics in this unusual year, and presenting the school's programs to potential students. EBAPE was FGV's first unit to provide a fully online undergraduate course (its degree in administration in 2020) and it is used as an example by the rest of FGV. To be able to hold all these events, we used digital platforms, such as Zoom, StreamYard and YouTube.

EBAPE also transformed the selection processes for all its programs into completely online formats, from registration to matriculation, including exams, offering greater safety and convenience to all candidates.

For more information, visit fgv.br/ebape

EESP

SAO PAULO SCHOOL OF ECONOMICS

DEAN: YOSHIAKI NAKANO

FGV EESP was founded in 2003 in order to contribute to FGV's overriding mission of promoting Brazil's economic and social development. In just over 15 years, it has become a center of excellence for research and education in economics and related sciences, acknowledged in Brazil and abroad. It publishes more papers with international impacts than any other economics department in Brazil and the whole of Latin America, according to leading international rankings. The school's economics course is now the most popular and coveted in Brazil. Its alumni are in high demand in the job market and they invariably develop successful careers.

The school offers undergraduate, specialized, professional master's and doctoral programs in finance and economics, a professional master's in agribusiness, and master's and doctoral courses in economics.

In 2020, EESP accompanied FGV's digital transformation, introducing new tools for internal management and collaborative platforms for remote teaching such as Zoom and Microsoft 365.

For more information, visit fgv.br/eesp

2020

- 215 undergraduate students.
- 203 non-degree graduate course students.
- 74 academic master's and doctoral students.
- 251 professional master's students.

2020

- Agreements and partnerships with various institutions in Brazil and other countries.
- 85 undergraduate students.
- 18 master's students.
- 6 doctoral students.

EMAp

SCHOOL OF APPLIED MATHEMATICS

DEAN: CÉSAR CAMACHO

EMAp, established in 2011, offers undergraduate courses in applied mathematics and, most recently, data science and artificial intelligence, providing a professional education that allows graduates to tackle real life issues that need mathematical models to solve them.

The school's research areas are data science, optimization and control theory, statistics, stochastic methods, quantitative finance and mathematical epidemiology. There are also master's and doctoral programs in these areas.

In 2020, EMAp accompanied FGV's digital transformation, innovating in the online teaching of mathematics and computing, allowing students across Brazil to be taught subjects such as programming, linear algebra and databases. EMAp also created special programs to introduce computer programming to high school students. In addition, in this year of COVID-19, EMAp scientists in the field of epidemiology actively participated in the advisory commissions of state governments and funding agencies, as well as international health committees.

For more information, visit fgv.br/emap

EPGE

EPGE BRAZILIAN SCHOOL OF ECONOMICS AND FINANCE

DEAN: RUBENS PENHA CYSNE

EPGE's goal is to contribute to teaching and the expansion of knowledge in the field of economics. Since it was founded in 1961, the school has educated many of Brazil's most renowned economists. Through its professors and students, it has also made a big contribution to the nation's development.

The school offers undergraduate, master's and PhD economics courses.

In 2020, EPGE accompanied FGV's digital transformation, quickly migrating all its administrative and academic processes and activities, ensuring the continuity of its operations, as well as the school's invaluable contributions to society and FGV.

For more information, visit fgv.br/epge

2020

- 171 undergraduate students.
- 177 master's students.
- 43 doctoral students.
- First place nationwide in the latest Brazilian Education Ministry's General Course Index (IGC), for the ninth time out of the 13 evaluations conducted so far, out of more than 2,000 higher education institutions in the country, in all areas of knowledge.
- Maximum score given by the Brazilian Education Ministry's graduate education support agency, CAPES, for all master's and doctoral programs.
- First place nationwide in the National Student Performance Exam (ENADE) for economics, for the third time, out of the five evaluations performed by the Education Ministry.
- First place nationwide out of undergraduate economics courses for the third time in the last four assessments by the National Association of Graduate Economics Centers (ANPEC).
- Top-ranked economics department in Latin America, according to Tilburg University Ranking.
- First place in RePEc Brazilian Economics Course Ranking.
- Maximum score (five stars) in Guia da Faculdade 2020.
- Launched new concentrated modular class format for its Professional Master's in Economics and Finance Program.
- Launched new research area in Energy Economics and Finance as part of its Professional Master's in Economics and Finance.
- Launched pioneering course called "Empirical Analysis and Economic Modeling Related to COVID-19".

2020

- 16 undergraduate students.
- 53 academic master's students.
- 38 professional master's students.
- 22 events featuring renowned specialists from Brazil and other countries in the fields of public policy and governance, covering topics such as democracy, corruption, governmental crises, federalism, public health and COVID-19.
- 53 articles, 7 books, 13 technical papers and 13 book chapters produced.

EPPG

SCHOOL OF PUBLIC POLICY AND GOVERNMENT

DEAN: EDSON KENJI KONDO

The School of Public Policy and Government was established in Brasilia, as part of FGV's efforts to expand its physical presence in Brazil's political center, thereby contributing more to the country's development. In 2019, the school launched its Master's in Public Policy and Government and Professional Master's in Economics. In 2020, it launched a Bachelor's Degree in Public Administration.

In just one year, the number of students increased from 24 to 107.

In 2020, in response to the COVID-19 pandemic, it intensified its use of information technology, teaching all classes remotely, adopting project planning and coordination platforms in digital media and digitizing practically all financial and approval processes. Responding to the demands of the digital world, it launched the @fgv.eppg profile on Instagram in the second half of the year, which now has 163 posts and 1,800 followers. The school's Facebook page has been viewed 180,000 times.

For more information, visit fgv.br/eppg

IDE

INSTITUTE FOR EDUCATIONAL DEVELOPMENT

DIRECTOR: RUBENS MARIO ALBERTO WACHHOLZ

IDE was created in 2003 to offer education products to serve the domestic market for continuing executive education. Today, the institute operates in more than 100 Brazilian municipalities through a network of affiliated institutions and FGV's own centers, offering courses and education solutions mediated by technology, developed by FGV schools and international partners.

The institute has an extensive portfolio of in-person and remote courses, as well as programs developed on demand for its corporate clients, giving students excellent professional development and enabling them to act securely in an increasingly volatile and competitive job market, through innovative education solutions of recognized quality.

In 2020, IDE responded to market needs and attracted 50% more students for its online specialized courses and around 40% more students for its short and medium online courses, compared to the previous year, totaling 21,000 students during the year.

For more information, visit fgv.br/educacao-executiva

2020

In 2020, various digital transformation initiatives were conducted by FGV:

- Launch of FGV Live, with a new 100% live class format, via web conference and taught by FGV professors.
- Training for more than 1,700 professors on the use of technology adopted in web conference classes and the use of the virtual learning environment (eClass FGV).
- Participation of around 40,000 students in IDE's specialized executive education courses in the first half of the year, of whom more than 30,000 then took part in web conference classes due to social distancing.
- Participation of approximately 90,000 students in IDE's executive education courses.
- Provision of more than 6,000 subjects in eClass FGV, to support classes mediated by technology.
- Wide exposure of free online courses, with more than 30 million accesses, 2 million registrations and nearly 800,000 completion declarations issued.
- Holding of 131 webinars, watched nearly 130,000 times, aimed at leveraging sales and providing knowledge to the events' participants.
- Development of FGV Executive Education Channel, with 9 podcasts featuring free academic content.
- Implementation of digital certifications and badges with blockchain technology in all short and medium courses, leading to the delivery of 1,669 badges for IDE courses.

2020

701 new distance undergraduate students.

IDT

INSTITUTE FOR TECHNOLOGICAL DEVELOPMENT

DEAN: FLAVIO VASCONCELOS

The Institute for Technological Development was founded in 2018 to offer courses for professionals who want to learn about new management tools and techniques and to quickly apply what they learn in the job market. Its professors are experts in various subjects and trained to work in distance education.

The school offers graduate technological courses in commercial management, financial management, management processes, public management and marketing.

In 2020, IDT accompanied FGV's digital transformation, implementing FGV Live Classes, which take place simultaneously for our distance learning courses, creating a sense of belonging for students. Currently, we have the only distance learning undergraduate courses with synchronous activities as part of all subjects. We also made our programs 100% online, after making a request to the Education Ministry and obtaining authorization to run our Online Technological Undergraduate Courses entirely online, with no need for face-to-face meetings ever, not even to take exams. The entrance exam and selection process are now digital, optimizing the whole process and facilitating interaction with candidates.

For more information, visit fgv.br/graduacao-tecnologica

RI

SCHOOL OF INTERNATIONAL RELATIONS

DEAN: CELSO CASTRO

The School of International Relations offers a study program for people who are interested in developing a global career and therefore need to acquire professional skills and competencies for international work environments. This training includes the development of analytical capacity, combined with a solid series of courses about data methods and data science.

The school runs an undergraduate course in Sao Paulo and non-degree graduate courses in Sao Paulo, Rio de Janeiro and Brasilia.

In 2020, the School of International Relations migrated to the digital environment in the context of the COVID-19 pandemic. To do so, it created an Excellence in Teaching Unit in order to train all professors for the transition to the remote class model, facilitating the adjustment of programs and syllabuses for the new context. The school also migrated its programs to online platforms (Work Retreats, CineRI, Career Center and Emotional Support) and created new initiatives (such as the Remote Holiday Internship Program and Remote Exchange Program). The Excellence in Teaching Unit started to hold town hall-style meetings with students to discuss the new circumstances imposed by the pandemic. On average, professors were available for twice as many weekly "Office Hours" meetings.

For more information, visit fgv.br/ri

2020

- 181 undergraduate students.
- 134 non-degree graduate students.

RESEARCH NETWORK

APPLIED RESEARCH AND KNOWLEDGE NETWORK

DIRECTOR: GORET PEREIRA PAULO

The Research Network was created in 2016 with the goal of promoting excellent, high-impact and innovative applied research, thereby furthering FGV's mission. To achieve this objective, the network has brought together research activities in the public and private sectors, while encouraging the formation of research networks in Brazil and abroad. One essential component for the development and execution of multidisciplinary research projects with high social impacts is the existence of a structure of incentives focused on the development of this type of project. The Research Network also contributes to the dissemination of knowledge produced by FGV's schools and research centers.

As well as the Research Network, the governance system for FGV's research activities includes the Research and Innovation Commission, whose task is to analyze the methodological rigor and potential impact of applied research projects conducted by FGV's different units; the Quality Center for Applied Research (CQPA), which ensures the technical quality and execution of proposals and reports associated with the work of applying the knowledge generated by FGV's research centers, schools and units; and the Ethical Compliance Committee for Research Involving Humans (CEPH), which aims to guarantee the highest ethical standards in research, based on the strictest ethical standards established by the national and international scientific community.

In 2020, the Research Network accompanied FGV's digital transformation and internally developed a knowledge management tool featuring consolidated information related to research carried out at FGV, promoting an integrated view of research centers, units, researchers and their areas of interest. It intensified the use of information technology, in order to obtain greater agility in communication and real-time collaboration with researchers. It made improvements to the planning and monitoring of research management activities, involving optimization of information management, data extraction, reporting and sharing, as well as file storage in the cloud. Proprietary tools were also developed for the management and dissemination of scientific knowledge, and to perform tests with research project management systems.

In 2020, the following activities to support development, obtain funding and disseminate the results of research projects carried out by the Research Governance System stand out:

1) Structuring of project to create the Center for Science Applied to Security (FGV CCAS), approved by the Sao Paulo Research Foundation (FAPESP). This initiative is a partnership between FGV and the Sao Paulo State Public Security Secretariat, the Inter-American Development Bank and the University of Sao Paulo. FGV CCAS' mission is to create a research framework that accelerates the use of data and artificial intelligence tools for decision making in the public security area, providing technical infrastructure and coordination between key stakeholders in the sector, with a view to stimulate the development of evidence-based assessment tools and public policies.

2) Submission of proposals and negotiation of cooperation agreements for three projects developed in partnership by FGV and the Aeronautics Technology Institute, which are part of the Route 2030 Program. This program is part of the Brazilian government's strategy for the development of the country's automotive sector and expansion of its exports of vehicles and auto parts. The Column B Demonstrator Project (known as DECOLAB) and Class A Surface Demonstrator Project (called DEMESTAA) aim to build demonstrators for the structural panel stamping process that are representative of the industrial capacity of the Brazilian tooling sector and can be used as a reference to map the process of constructing stamping tools; identify technological, methodological and organizational bottlenecks; develop a competitiveness diagnosis; disseminate multidisciplinary knowledge related to the process between the tooling sector and its supply chain in a systematic and structured way; and create an ecosystem of sector integration for continuous discussion and innovation in the sector. To this end, companies of different types (car makers, tool providers, service providers and software companies) are partners in this initiative.

The Modeling and Identification of Defects in Class A Surfaces and Stamped Structures Project (known as MISCAE) aims to improve the quality of tools for the automotive sector (zero defects in shaped parts) and to reduce costs and the time taken to test and correct tools, by improving tooling and part simulation, introducing new ways of assessing surface quality and virtualizing manufactured parts.

3) Coordination and monitoring of execution of the activities of the Institutional Internationalization Project linked to the CAPES-PrInt Program.

4) Management and monitoring of research projects associated with the Newton Fund Institutional Links Program operated by the British Council in Brazil. The research projects associated with this program represent partnerships between FGV, Fiocruz, the London School of Economics, the University of London and the London School of Hygiene & Tropical Medicine.

5) Creation and dissemination of Research Ethics Manual.

6) Use of LinkedIn by the Research Network to disseminate FGV's outstanding research projects, especially multidisciplinary ones, and general information of interest to researchers.

FGV KNOWLEDGE

DIRECTOR: SIDNEI GONZALEZ

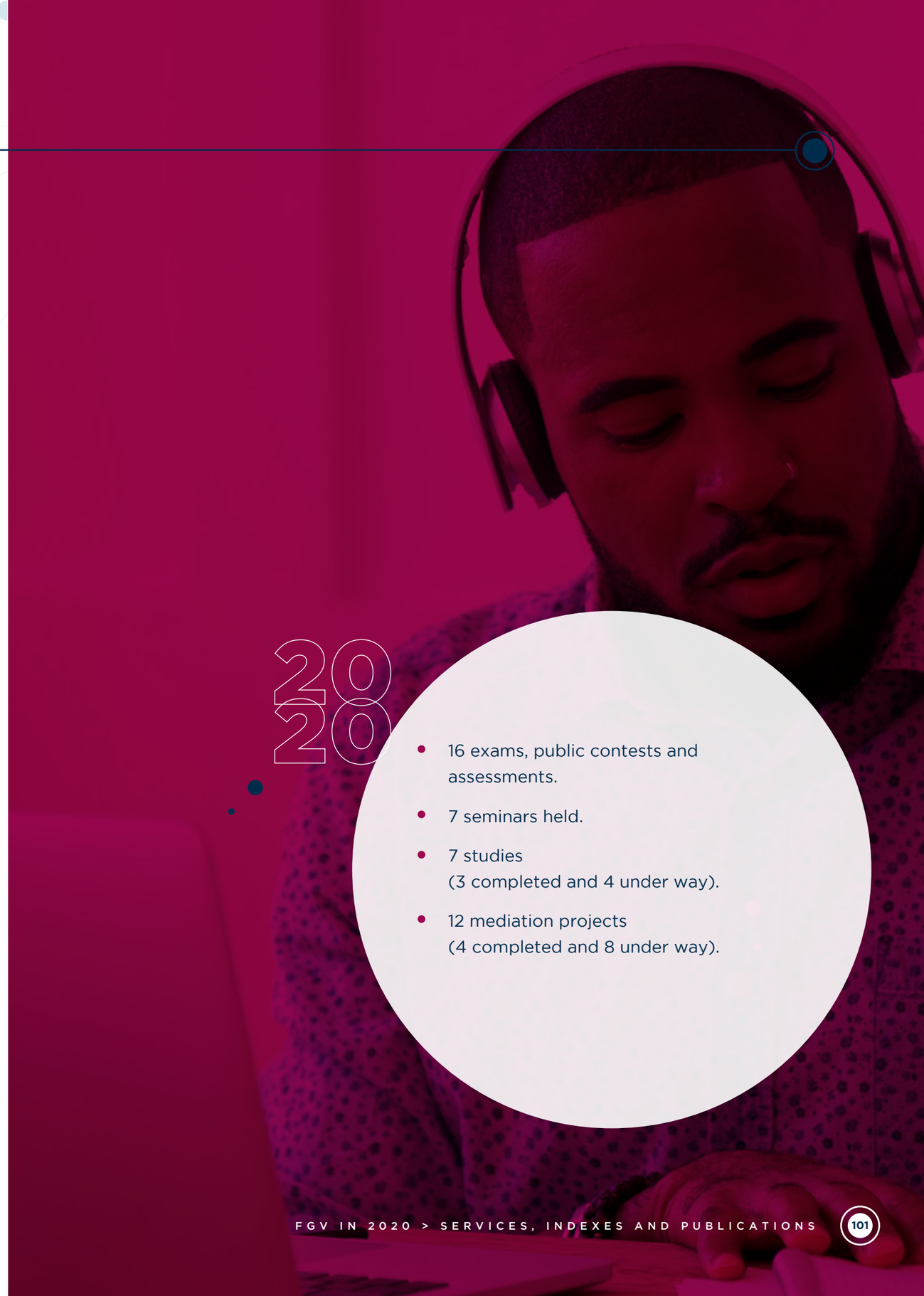
FGV Knowledge has extensive experience in the organization and management of exams, public contests and educational assessments for a variety of public administration organizations and the private sector, at national, state, municipal and international levels. The National High School Exam (ENEM) and the Brazilian Bar Association's National Exam stand out. In line with Fundação Getulio Vargas' mission to stimulate Brazil's socioeconomic development, FGV Knowledge selects and trains technical staff of excellence for the country.

Based on FGV's solid teaching tradition, FGV Knowledge has highly qualified technical and academic professionals, who develop innovative assessment instruments in digital and printed forms. Its work prioritizes the mastery of fundamental principles and critical reasoning in solving problems, valuing the skills necessary to perform functions in a wide variety of areas of expertise. Over the course of more than 10 years, FGV Knowledge has held tests for approximately 20 million people.

Committed to the evaluation, production and dissemination of knowledge, FGV Knowledge produces studies, research and publications, as well as holding debates to generate public goods and contribute to public policymaking. FGV Knowledge's Center for Judicial Innovation, Administration and Research contributes to improvements to the justice system and to strategic conflict management through mediation.

The year 2020 was marked by investment in processes to institutionalize and internalize procedures, always focusing on new work models, especially ones backed by information technology. FGV Knowledge also invested in expanding its market activities and in new projects. This effort was successful, and the year ended with around 20 new projects, in the areas of assessment, the judiciary, security, statistics, culture, academia and certification in the field of medicine. FGV Knowledge was aided by its multidisciplinary approach in this very challenging year. The digitization of various projects allowed it to meet deadlines and make deliveries in a more dynamic, sustainable and productive way for clients. FGV Knowledge was able to grow even in this turbulent year, proving its disruptive character and continuous pursuit of new ways of working.

For more information, visit fgv.br/conhecimento



2020

- 16 exams, public contests and assessments.
- 7 seminars held.
- 7 studies (3 completed and 4 under way).
- 12 mediation projects (4 completed and 8 under way).

2020

- 25 reprints and
  27 new titles published:
  • 2 new editions;
  • 11 new print editions;
  • 25 new e-books.

- Around 26,000 copies of books printed and more than 430 units printed on demand, as well as thousands of downloads. Around 60% more downloads of free e-books than in the previous year.

FGV PRESS

DIRECTOR: MARIETA DE MORAES FERREIRA

Created in 1974, FGV Press aims to publish and disseminate works in various fields of knowledge, thereby helping improve education in Brazil.

Its catalog embraces areas such as administration, economics, law, sociology, philosophy, politics and history, favoring and encouraging FGV authors, as well as other thinkers in the academic community across Brazil and in other countries.

As well as actively producing new publications, attracting many reviews and citations in various academic journals and press outlets, FGV Press has had an on-demand printing service since 2018, which has had a major impact on the publishing market. In this way, professionals and students have ready access to many books in its vast catalog, which sometimes used to run out.

In 2020, FGV Press accompanied FGV's digital transformation, holding seven webinars to launch new books. Using its more than 15 years of experience with e-commerce, it adapted to the new digital circumstances in a stable and secure way, without any major structural changes, achieving enhanced performance in online formats. It also had the opportunity to participate in the ABEU and USP book fairs, as well as the Sao Paulo Biennial Book Festival, which took place online in 2020, raising FGV Press' profile and boosting its website's sales and other results.

For more information, visit fgv.br/editora

FGV EUROPE

DIRECTOR: CESAR CUNHA CAMPOS

In line with its institutional guidance to look for opportunities for knowledge and state-of-the-art academic and applied experiences, FGV opened its first representative office in Europe in March 2016. FGV Europe was created to foster links between Brazil and other important nations, and to further strengthen FGV's interactions with major European think tanks. The city of Cologne, Germany, was chosen at the ideal base for the office, due to its strategic geographical location at the heart of Europe, as well as FGV's existing partnerships with prominent public, third and private sector institutions in the region.

In 2020, FGV Europe accompanied FGV's digital transformation, updating its website, making it more intuitive for users and repositioning itself as a knowledge hub. It reaffirmed its knowledge partnership with the OECD by providing all the Portuguese content for the "Tackling the Coronavirus (COVID 19), Contributing to Global Efforts" platform, strengthening FGV's role as a trustworthy source of high-quality analyses at a time of severe economic and social crisis.

For more information, visit fgv.br/fgveurope

2020

- Held and participated in 20 webinars.
- Formed two strategic partnerships with European public and private institutions.
- Signed and developed three technical consulting projects.

2020

- In top 5 in Bloomberg ranking of macroeconomic forecasters.
- 2,166,643 prices surveyed over the course of the year.
- 69,334 survey questionnaires applied during the year.
- More than 340 indexes, surveys and other economic indicators published.

IBRE

BRAZILIAN INSTITUTE OF ECONOMICS

DIRECTOR: LUIZ GUILHERME SCHYMURA

Founded in 1951, IBRE has the mission of researching, analyzing, producing and disseminating high-quality macroeconomic statistics and applied economic research to enhance public policy or private sector activity in the Brazilian economy, stimulating the country's economic development and social well-being.

Its functions include the calculation of benchmark prices, the production of sector studies and forecasts, and the monthly collection of prices and data of economic nature together with partner companies.

In 2020, IBRE accompanied FGV's digital transformation, carrying out the following initiatives:

1) Greater participation in the media, increasing the value of exposure following the advent of the pandemic and the economic crisis.

2) Use of Team and Zoom tools for remote communication and management; Trello for process and schedule management; Power BI to use and share indicators and "R" language; and Python to develop systems needed to produce indicators. The use of such tools and programming languages rapidly generated significant advances in communication, allowing the rapid, efficient and integrated dissemination of knowledge.

3) Modernization of statistics production. Due to difficulties in accessing many of the places where data was obtained to produce price indexes, IBRE accelerated the move to obtain data by web scraping, which was essential for the continuity of statistics during the pandemic.

4) In terms of events, 11 webinars and 5 live streams were held, in particular the Third Macroeconomic Analysis Seminar, held on September 29, which attracted more than 36,000 views on FGV's and partner Estadão's platforms. This was FGV's most viewed event in 2020.

5) IBRE has been working on the generation of specific content through digital thematic platforms. We now have the IBRE Blog, Fiscal Policy Observatory, Regis Bonelli Productivity Observatory, Inflation Portal and Economic Cycle Portal. The IBRE Blog is particularly popular, having become an important platform for discussing topics on the Brazilian economic agenda.

In short, these digitalization efforts contributed to the modernization of statistics production, the generation of new products, optimization of physical spaces and lower staff turnover.

For more information, visit fgv.br/ibre

PROJETOS

DIRECTOR: LUIZ CARLOS G. DUQUE

FGV Projetos is the unit in charge of generating and applying the technical and academic knowledge internally produced and accumulated by FGV's schools and institutes.

Over the course of more than 30 years, as a technical advisory unit, FGV Projetos has advised public and private sector organizations in Brazil and abroad, developing projects in the fields of public policy, education, economics, management, sanitation and tourism. The unit also designs, organizes and manages certifications in all areas of knowledge, besides hosting international technical seminars and congresses.

In 2020, FGV Projetos accompanied FGV's digital transformation, supporting and holding various webinars, including two important series. The first was a series of digital roundtables to discuss how the COVID-19 pandemic has imposed major difficulties in our lives. To help deal with these problems, FGV Projetos, together with the Brazilian Institute of Legal Studies on Infrastructure (IBEJI), held this series of webinars, showing the impacts and proposed solutions in different sectors of the economy. The idea was to bring together market leaders and public managers whose organizations have been affected, to debate the current situation and proposals to tackle the crisis. These events were anchored in FGV's mission to stimulate Brazil's socioeconomic development.

Another project worth mentioning is the "Sport's Challenges and Prospects Following the COVID-19 Pandemic" series. Sport has been heavily affected by the pandemic, as nearly all activities have been suspended. Thinking of its institutional mission to promote Brazil's socioeconomic development, FGV organized this series of events, which discussed a variety of issues, such as the pandemic's impact on sports championships and leagues, athletes' training, public policies and sport at government schools, always with a view to finding solutions to overcome the crisis.

For more information, visit fgv.br/fgvprojetos

2020

- 122 technical advisory projects and 7 certification projects under way.
- 28 seminars and congresses held and supported.

CCE

Business Cooperation Committee
President: João Carlos de Luca

CEM

World Economic Center
Director: Carlos Geraldo Langoni

The Business Cooperation Committee (CCE) was established in 1990 to discuss the implications of the global economy's transformations for Brazil.

CCE brings together private sector representatives through the World Economic Center (CEM) to organize studies and seminars on different issues related to Brazil's competitive integration as an emerging power, in a dynamic and challenging external context, leveraging FGV's excellence as a think tank.

THE ARMED FORCES AND FGV

The Brazilian Armed Forces and FGV are partners in the following initiatives to promote technological development and national security:

SUBMARINES

The Brazilian Navy's Submarine Development Program (PROSUB) was launched in 2008, through a technology transfer agreement between Brazil and France, to protect Brazil's natural assets and guarantee the country's sovereignty in the sea through investment in naval power and the development of the defense industry. At the invitation of the Navy, FGV has participated in this initiative through the development, implementation and execution of its monitoring program.

In the current stage, one nuclear-powered submarine and four conventional submarines will be built. Two of them are now undergoing tests in the ocean.

FRIGATES

The Program to Acquire Surface Vessels (PROSUPER) is one of the Brazilian Navy's top-priority programs. It encompasses the acquisition of corvettes, ocean patrol ships and logistics support ships. Currently, PROSUPER's main initiative is the Tamandaré Class Corvette Program, which involves constructing four corvettes.

FGV cooperated with the Navy in the first two phases of this program, to assist it in selecting the winning consortium in an international tender, and then to support the Brazilian Defense Ministry's Naval Project Management Company (EMGEPRON) in drafting contracts to build the frigates.

BRAZILIAN MULTI-PURPOSE REACTOR PROJECT

The Brazilian Multi-Purpose Reactor Project is designed to give Brazil strategic infrastructure for the domestic development of activities in the nuclear sector in the areas of social applications, power generation and naval propulsion. FGV conducted a study for Amazônia Azul Tecnologias de Defesa S/A (AMAZUL), to formulate an institutional model to operate the reactor.

AMMUNITION FACTORY

The Brazilian Navy's Admiral Jurandyr da Costa Müller de Campos Factory produces all the medium and large caliber ammunition used by the Navy. FGV was commissioned by the Brazilian Defense Ministry's Naval Project Management Company (EMGEPRON) to perform an analysis of strategies for the factory's development.

Photo credit: Andre Gustavo Stumpf Filho

RESEARCH AND DEVELOPMENT

The Army Command and General Staff School has been running its Graduate Military Sciences Program since 2001, in the areas of defense management, peace studies and war studies. FGV is conducting a technical advisory project to expand research and development in the military sciences at the school, focusing on academic production, applied research and teaching cooperation. Among other things, this involves loaning professors to the program.

FGV also has a cooperation agreement with the Air Force University, which is running its graduate program in the areas of Brazilian aerospace power, security and defense, relationships between states, contemporary strategic thinking and aerospace power. The agreement is aimed at providing technical advice to the Air Force University, holding seminars and running courses in the area of strategic and process management. For example, the Second Cyber Security and Defense Seminar, whose theme was "Cyber Defense Challenges in Brazil's Space Program," brought together civilian and military authorities and experts from Brazil, Colombia, the United States and Italy.

Photo credit: SAAB

Photo credit: José Dias/ Presidency of the Republic

TRAINING

FGV runs various courses to train Armed Forces officers. Some of them are described below:

- **Army Policy, Strategy and Senior Management Course (CPEAEx)**

Since 1999, FGV has been running the Executive MBA on Administration: Policy and Strategy, within the scope of the Army Policy, Strategy and Senior Management Course (CPEAEx), at the Army Command and General Staff School. The program is designed for colonels, to enable them to advise the highest echelons and strategic areas of the Armed Forces, Defense Ministry and government bodies. So far, 873 senior officers have taken the course, and 117 of them have since been promoted to general.

- **International MBA on Political and Strategic Studies**

Since 2015, FGV has been conducting this executive MBA course for senior army officers from Brazil and friendly countries, most of whom have a master's and/or doctorate, in partnership with the Army Command and General Staff School. The Executive MBA on Administration: Political and Strategic Studies is held entirely in English, and so far it has been taken by officers from 24 countries. The program thereby contributes to Brazil's strategic international cooperation activities, boosting the country's global presence and image.

- **Undergraduate and Graduate Entrepreneurship Course**

In 2015, the Military Engineering Institute (IME) and FGV signed a memorandum of understanding to share professors, jointly hold events and carry out research in areas of common interest, leading to numerous joint courses and integrated activities. In particular, many IME students have attended classes and seminars at various FGV schools, and IME professors have given classes across FGV's network. Since 2016, FGV and IME have been running the Entrepreneurship in the Public and Private Sectors Course. This course is taken by mixed groups of students from both institutions. The technological capabilities of IME students and the administrative skills of FGV students are combined. Startup projects have also been presented annually to an audience of potential investors.

- **Executive MBA on Strategic Planning and Management**

Since 2019, FGV has been helping the Air Force Command and General Staff School by conducting the Executive MBA on Strategic Planning and Management as part of the training process for Brazilian Air Force officers. This project covers the whole of the country and it takes place 100% in online format. So far, 475 officers have done the course.

Photo credit: Brazilian Navy

ASDI

Institutional Development Area
Head: Zilla Patricia Bendit

ASDI is responsible for raising monetary and non-monetary resources, coordinating relations with companies that make contributions through the program called the FGV Partners' Club.

In 2020, ASDI accompanied FGV's digital transformation, displaying the logos of sponsored rooms in the eClass environment, where students enter each classroom, and on the Zoom platform, used by professors. As a result, six sponsored spaces were renewed and two new ones were confirmed. In addition, the schools' donation websites were updated to receive online donations, giving donors security and reliability. In total, three campaigns and one video were developed in order to increase donations from alumni. As a consequence, the value of donations and number of donors both doubled in 2020, compared to in 2019. A profile was also launched on Facebook and Instagram, called @parceriasfgv, and posts are made up to three times a week. In less than two months, they already have 100 followers. FGV also started to disclose reports about its **Scholarship Fund 1**, **Scholarship Fund 2**, **Partnerships** and regulations online. The **FGV Community Donation websites** of FGV's business and economics schools were updated, making the system more secure and agile. To aid company prospecting, we created a video called **ASDI's Partnerships**.

DCI

Internal Control Division
Director: Maria Alice da Justa Lemos

Established in 2016, DCI is responsible for implementing and overseeing FGV's Internal Control and Compliance System. The division promotes management efficiency and efficacy by achieving strategic goals and managing risks, besides ensuring compliance with applicable laws and regulations.

DICOM

Communications and Marketing Division
Director: Marcos Henrique Facó

DICOM is the division responsible for FGV's communications and marketing, safeguarding the FGV brand's solidity and helping maintain its credibility among internal and external stakeholders. Its mission is to promote FGV's identity in Brazil and overseas as a traditional, innovative, pioneering, development-oriented and high-tech organization.

In 2020, DICOM underwent an accelerated digital transformation and sought new formats to let FGV continue to disseminate knowledge through webinars – most of them public and free of charge. The area underwent a major overhaul, acquiring new online platforms for live streaming and holding more than 800 digital events. It also produced new web series, including periodic videos on key topics related to the coronavirus' impacts. It made more than 60 programs, which were viewed thousands of times.

To adapt appropriately, respecting the specific characteristics of each course and student profile, it was necessary to get a better understanding of the moment that each one was experiencing, their needs and how FGV could improve the provision of its education services. To this end, DICOM also carried out market research with students and professors, revealing their level of satisfaction and enabling a better adaptation to new conditions, always seeking excellence in FGV's teaching.

DINT

International Affairs Division
Director: Marlos Correia de Lima

The International Affairs Division's mission is to promote FGV's international presence. By supporting FGV's units in the formulation, execution and assessment of their international development strategies, DINT helps strengthen FGV's positioning as an internationally respected think tank and education/research institution. Its activities include mapping, prospecting, recommending and capitalizing on opportunities in different parts of the world that are prioritized by the president, while supporting other FGV units.

In 2020, DINT accompanied FGV's digital transformation, adopting technological tools and new processes to ensure the maintenance of projects and strengthen relationships with foreign partners and clients. Through digital integration and promotion of innovative behavior, it was possible to expand the reach of international activities, despite the pandemic, prospect new businesses in the digitalized environment and enhance FGV's international brand recognition. DINT's main achievement was the digital integration of production processes with clients abroad, allowing significant productivity improvements.

DO

Division of Operations
Director: Mario Rocha Souza

The Division of Operations is responsible for all FGV's administrative support and customer service infrastructure in Rio de Janeiro, Sao Paulo and Brasilia. Its functions include operational activities, information technology, purchasing, academic records, educational support and career development.

In 2020, the Division of Operations accompanied FGV's digital transformation, implementing information and communications technology tools to enable the continuity of classes, meetings, selection processes and other events in an online and synchronous manner. Between March and December, Zoom made it possible to have 141,804 meetings and classes, involving 2,851,431 participants in master's and PhD courses alone. Quickly responding to the demands imposed by the pandemic, the use of VPN was expanded, facilitating remote work by enabling electronic signatures for payments, contracts and other documents. These and other digital tools allowed us to continue our activities and also shorten distances, speed up processes and reduce the consumption of inputs.

DRH

Human Resources Division
Director: Luiz Carlos Ranna

FGV's Human Resources Division provides senior management with information to support management and strategic decisions, promoting integration between all the institution's areas and performing activities that add value to staff training, development and well-being, in addition to managing employee records. The division focuses on maintaining the confidentiality of processes and information, while guaranteeing excellent services and satisfaction for all internal and external clients.

In 2020, the division accompanied FGV's digital transformation, providing numerous online training courses, such as onboarding programs, internship programs and short courses, for more than 1,000 employees. It also supported the hiring of qualified technology professionals, conducting the entire recruitment, selection and admission process virtually.

DRH also held online meetings and webinars focused on the quality of life and mental health of its employees, who were working from home, featuring qualified professionals in the areas of medicine, psychology and social work. Likewise, it carried out several other virtual initiatives and communications focused on workplace health and safety and COVID-19 prevention, as well as providing telemedicine and tele-guidance through its medical clinics, social service professionals and health insurance.

This same year, DRH made investments to modernize its payroll and personnel management system, which as of 2021 will have a web system, app, virtual time clock system, onboarding system, optical character recognition system, chatbot, dashboard and ability to use digital signatures.

Provost Office

Office of the Provost for Education, Research and Graduate Studies
Provost: Antonio de Araujo Freitas Júnior

The Provost Office's objective is to orient and oversee FGV's schools in terms of subjects related to regulation, academic management and the use of new technologies, besides keeping the institution's senior management up to date on domestic and international regulatory demands in the areas of teaching, research and graduate education, which are continually changing. The Provost Office's Ombudsman receives and deals with demands from the FGV community. It also promotes synergies between schools and their researchers, especially through network programs.

SB and NDOc

Library System and Documentation Center
Director: Marieta de Moraes Ferreira

FGV's Library System (known by Portuguese acronym SB) was created in 2012 with the main goal of promoting integration, modernization and innovation with respect to FGV's libraries, as well as synergies between them and the institution's schools and units, focusing on forming and improving academic archives. The system encompasses the Mario Henrique Simonsen Library (BMHS) in Rio de Janeiro, the Karl A. Boedecker Library (BKAB) in Sao Paulo, the Brasilia Library, the Digital Library and the Documentation Center (NDOc).

The Library System is continually looking to create policies to facilitate the bibliographic research activities of researchers and students, and to enhance and expand FGV's academic output and records, while raising the visibility of researchers.

NDOc, originally created in the 1960s as the FGV Central Archives, has been part of the Library System since 2009. Its mission is to supply the institution with documentary information needed for the full performance of its activities.

In 2020, the Library System accompanied FGV's digital transformation, conducting seven training sessions in webinar format, broadcast via YouTube. This format allowed the system's libraries to maintain contact with their users, as well as strengthening internal teamwork.

Implementing such a service was already a goal of the Library System even before the pandemic, due to the need to reach the community of FGV's affiliated network, spread across the country, and to offer even more convenience to all users, who can now access the content at their own time and pace. Also in 2020, the system's archives, which contain 378,030 printed works, received 2,734 new items via purchases and donations. In all, users had access to nine collections of e-books acquired by purchase or subscription (Ebsco Ebooks, Ebook Central, Lectio, Oxford Handbooks, CAPES, RT Online, Minha Biblioteca, Pearson and Ebooks Editora FGV); 32 databases; CAPES' periodicals portal; and the 48 journals produced by FGV's schools and units, which are kept in the FGV Repository of Scientific Journals, amounting to 70,530 digital articles. In 2020, 1,157 new titles were added to the FGV Digital Repository, which now contains 26,000 documents, including dissertations, theses and other digital objects.

For more information, visit sistema.bibliotecas.fgv.br.

Audit Superintendent's Office

Superintendent: Eduardo de Oliveira

The Audit Superintendent's Office is an internal control body that reports to FGV's top management. Its mission is to add value, helping FGV achieve its planned results and goals, including improvements to processes, internal controls and governance.

In 2020, in line with guidance from FGV's top management, the Audit Superintendent's Office intensified the digitalization of its processes and procedures, making the work done by FGV's units more efficient.

Controllership Superintendent´s Office

Superintendent: Jacques Maidantchik Junior

The Controllership Superintendent´s Office is the FGV area responsible for providing accurate and timely financial information to the organization's managers, helping them make better decisions regarding financial and economic subjects.

In 2020, accompanying FGV's digital transformation, the Controllership Superintendent´s Office, in partnership with FGV's IT area, developed an electronic payment approval procedure to replace printed forms. As a result, all documents supporting payments, such as invoices and commercial proposals, started to be used exclusively in PDF version.

Treasury

Treasurer: Jorge Ricardo Ferreira Guilherme

FGV's Treasury is responsible for organizing and controlling the integrity of the institution's checking accounts and financial investments, following the deliberations of the president and Board of Directors, as well as coordinating accounts receivable, payments and non-payments.

Over the course of 2019, the Treasury digitally transformed some of its processes, especially those involving banking institutions. Banks were demanding that operations take place through the sending of files (for payments and receipts) and that authorizations take place through web applications, so the Treasury, with the help of the IT area, modified its internal systems and processes.

Thus, in 2020, when the pandemic obliged FGV to digitalize its processes, the Treasury was already well on the way to complying with a demand that imposed itself at the end of March. We merely adapted the way we administered our everyday operations remotely. We set up groups in web applications and we only deployed staff in person when necessary, to support other areas of FGV.

FGV Chamber

Chamber FGV of Mediation & Arbitration
Director: Julian Chacel

FGV created its Chamber of Arbitration following the enactment of Brazilian Law 9,307 of 1996, which regulated institutional arbitration in Brazil. Its main function is to manage arbitration proceedings, ensuring that all deadlines and phases are executed in accordance with the law. The mediation phase can precede arbitration and, if an agreement is accepted by the parties, there is no need for arbitration.

It should be stressed that arbitration courts do not judge. They may only be convened when the parties decide to do so. The chamber is presided over by FGV's president and it has two directors, as well as a president of the Arbitration Commission, as provided for in regulations. There is also a panel of arbitrators made up of people with recognized technical qualifications and a spotless reputation, as well as professors from FGV's schools in the fields of law, economics and administration.

In 2020, the chamber accompanied FGV's digital transformation, conducting arbitration and mediation procedures entirely online through videoconferences and other virtual means. This format has enabled greater speed, security, feasibility and savings for users of the services provided by this chamber.

Acting remotely since the beginning of the pandemic, the chamber's employees worked to shift all administrative processes to the digital realm. Before, each case's files were presented and stored in physical form.

During the pandemic, archives have been presented by the chamber's users and clients exclusively in digital format and stored in the cloud. In this way, bureaucratic and administrative steps have become more dynamic, cutting compliance time and freeing up physical space previously used to store procedural documents.

For more information, visit fgv.br/camara.

CDMC

Center for the Development of Mathematics and Science
Director: César Camacho

CDMC was created in 2017, to identify talented young people who won medals at the Brazilian Public School Mathematical Olympiads and other national Olympiads, coming from public schools across Brazil, especially non-selective ones. The purpose of the center is to encourage these students to pursue undergraduate and graduate studies at FGV, thereby helping to supply the trained scientists and professionals that the country needs.

The center also maps non-selective public schools of excellence, based on their performance in Brazilian Education Ministry assessments and knowledge Olympiads, in order to help train their teachers, enhance their management systems and better prepare their students.

In 2020, CDMC accompanied FGV's digital transformation, holding virtual service sessions and meetings with students, thereby assisting and maintaining good relationships with all of them.

For more information, visit fgv.br/cdmc.

CERI

Center for Regulation and Infrastructure Studies
Director: Joisa Campanher Dutra

The Center for Regulation and Infrastructure Studies (FGV CERI) is Fundação Getulio Vargas' unit tasked with thinking in a structured way about infrastructure sector regulation, based on solid economic fundamentals. Its mission is to generate and disseminate knowledge about regulation and utility industries in Brazil and Latin America, and its main objective is to carry out applied research, consulting assignments and research and development projects, focusing on regulation and themes related to infrastructure sectors. The center has a multidisciplinary team that actively contributes to producing and disseminating knowledge on topics relevant to the development of infrastructure sectors, including energy, transport and logistics, urban mobility, water and sewage, and telecommunications. These industries are monitored and analyzed from the perspectives of regulation, governance, long-term financing and risk allocation, modeling of concessions and public-private partnerships. CERI also has a network of national and international partners, including regulatory agencies, the World Bank, the Inter-American Development Bank, Florence School of Regulation, Colorado School of Mines, Harvard Kennedy School and Queensland University. To improve this analysis, the use of data science, especially machine learning and artificial intelligence, has become increasingly present.

In 2020, CERI participated in FGV's digital transformation, implementing (through CERILAB) the COVID-19 Regulatory Monitor, an initiative to compile data and generate knowledge about rules and regulations issued in Brazil and other countries, whenever there are impacts on Brazilian institutions, resulting from or in response to the COVID-19 pandemic.

For more information, visit fgv.br/ceri.

FGV Growth and Development

Center for Economic Growth and Development Studies
Directors: João Victor Issler and Pedro Cavalcanti Ferreira

FGV Growth and Development is a center dedicated to research in the area of economic growth and development. It studies topics such as the reasons why some economies are wealthier than others and what makes one country grow quickly while others remain stagnated. In this comparative context, it seeks to understand Brazil's recent experience. The center also looks at subjects linked to natural resource economics in the oil and gas, electricity and mining sectors, given that Brazil has great economic potential in relation to these resources. An important part of the center's work is to identify, suggest and influence the design of economic policies aimed at removing obstacles to Brazil's economic development.

The Center for Studies in Startups, Innovation, Venture Capital and Private Equity (FGV NEST) is a pioneering FGV Growth and Development initiative launched in 2018. It has contributed actively to Brazil's high-impact innovative enterprise ecosystem. Since it was created, FGV NEST has acted as a knowledge hub and leader by bringing together, promoting and stimulating various initiatives in the public and private sectors in the areas of startups, innovation, venture capital and private equity in Brazil.

In 2020, FGV Growth and Development started a joint research project with Petrobras, anchored in three cooperation agreements with the company. The project's research areas include forecasting of oil prices using machine learning methods, simulation of propagation models, networks in an environment of general equilibrium, and changes in the oil products market following Petrobras' sale of refineries. FGV NEST was involved in many other activities in 2020, holding webinars, participating in online events and carrying out numerous interviews. One of the webinars, in August, was called "Purchases of Goods and Services from Startups by State-Owned Enterprises: Challenges and Opportunities." FGV NEST conducted more than 20 interviews, spanning topics related to innovation, startups and entrepreneurship, including an interview called "Are startups better prepared for the coronavirus crisis?" for VAE/Globo.com in May.

DAPP

Department of Public Policy Analysis
Director: Marco Aurelio Ruediger

DAPP is focused on the development of applied studies and solutions, based on methodologies in the social sciences, especially sociology and politics, together with the intensive use of information technology, communications and linguistics. While conducting research in key areas for Brazil, DAPP also aims to develop innovative solutions for the public and private sectors, using data design, transparency instruments and real-time surveys of people's perceptions and the impacts of policies through analysis of social networks.

In 2020, DAPP reinforced its leading position in strategic public policy analysis, expanding its areas of research and media coverage, as well as accompanying FGV's digital transformation. In a natural development of its activities, it broadened the scope of its activities into education, running specialized courses, and it developed a project to create the Fundação Getulio Vargas School of Communication, Media and Information (FGV ECMI), based on all the expertise built up by the department in recent years in the field of the network society and digital communication. This project was approved by FGV's board and an application to establish it was made to the Education Ministry. This initiative aims to put FGV at the cutting edge of knowledge production in a strategic area, considering digital interconnectivity and its impacts on the economy, public policy and social processes.

This year, among other significant initiatives, the department launched the Digitalization and Democracy Project, supported by the German Foreign Ministry and German Embassy in Brazil, and it expanded its Digital Democracy Room to other Latin American countries. This initiative was supported by the Open Society Foundations (OSF) and National Endowment for Democracy (NED). DAPP became the first center in Brazil to be supported by Facebook to conduct research as part of the Facebook Research public contest, competing against hundreds of renowned institutions across the world, of which just 25 were chosen. Other projects carried out by DAPP include work with NGO Greenpeace International, the Brazilian Banking Federation (Febraban) and, in particular, the Superior Electoral Court. The court's president, Federal Supreme Court Justice Luís Roberto Barroso, publicly acknowledged FGV and DAPP, presenting them with a certification of recognition by their support in tackling disinformation during the 2020 municipal elections.

For more information, visit fgv.br/dapp.

DGPE

Center for the Development of Public Management and Educational Policy
Director: José Henrique Paim Fernandes

DGPE is tasked with promoting the development of municipal government management and supporting teaching systems to improve education management, in line with FGV's mission of promoting Brazil's socioeconomic development. It began its activities in mid-2018.

In 2020, DGPE accompanied FGV's digital transformation, holding webinars to discuss education challenges during the pandemic, bringing together partners and other areas of FGV to disseminate knowledge, and obtaining more than 80,000 views. It also launched free courses focused on basic education. DGPE also developed projects with state education secretariats and 33 municipal governments in Maranhão, involving the use of technology and management topics aimed at learning, the municipal curriculum and teaching children how to read and write at the right age.

FGV Energy

Center for Energy Studies
Director: Carlos Otavio de Vasconcellos Quintella

Created in 2013, the Center for Energy Studies seeks to expand interdisciplinary knowledge of energy-related subjects in the fields of public and business administration, economics, applied mathematics, law and the humanities. Its goal is to promote FGV's strategic positioning in the energy sector, strengthening its recognition as a leading think tank in the area.

In 2020, FGV Energy accompanied FGV's digital transformation, holding 50 webinars, which were watched by more than 80,000 people.

For more information, visit fgv.br/fgvenergia.

Secondary Education

Director: Marieta de Moraes Ferreira

Fundação Getulio Vargas' involvement in debates about education in Brazil dates back practically to its founding in the mid-1940s. Its activities in this area began in 1950, when it started Colégio Nova Friburgo, a school that implemented innovative education practices and became a model of excellence and innovation in basic education. In 1971, the Institute for Advanced Studies in Education (IESAE) was founded to promote discussion and alternative ways of dealing with educational issues.

In order to resume this area of activity, the Secondary Education Program was launched in 2003 with the aim of promoting discussions about subjects related to this level of education and providing knowledge and experience to contribute to this area, which is fundamental to Brazil's socioeconomic progress. These activities have involved the publication of instructive books and the creation of the Secondary Education Website.

In 2020, Secondary Education accompanied FGV's digital transformation, making its Secondary Education Platform available to state government schools free of charge. Amid the changes that the COVID-19 pandemic imposed on schools, this portal has been an essential tool to help students recreate a productive learning routine, providing free access to a database of more than 11,000 unique items aligned with the subjects tested by the National High School Exam (ENEM). In this way, teachers and schools obtained a more accurate diagnosis of how their students are developing their skills in this new context. FGV is helping schools overcome this challenging moment for education in Brazil, just as it has helped them overcome challenges for several decades.

For more information, visit fgv.br/ensinomedio.

NPII

International Intelligence Unit
Director: Renato Galvão Flôres Junior

The International Intelligence Unit produces content on issues that have a global dimension, in order to open up markets and form partnerships abroad for FGV and Brazil, while bringing intelligent solutions, ideas and investments to the country. NPII generates knowledge on key international topics considered crucial to Brazilian interests.

In 2020, NPII accompanied FGV's digital transformation, successfully holding some of its planned seminars and panel discussions in the form of webinars and incorporating greater use of digital tools in its plan for 2021.

For more information, visit iiu.fgv.br.

FGV Social

Center for Social Policy
Director: Marcelo Neri

FGV Social aims to promote inclusive development in Brazil, combining applied research with social debate and the implementation of public policies. Addressing Brazil's most pressing social issues in an integrated way, the center disseminates knowledge and inspires new inclusive practices. It provides specialized training and advice for projects in different areas, partnering with government organizations, companies and civil society organizations in Brazil and abroad. Through empirical research, focused on large public microdata sets and the design and evaluation of public policies, the center identifies and promotes new transformations in society.

In 2020, FGV Social accompanied FGV's digital transformation, remotely developing and launching five research projects for society related to the COVID-19 pandemic's impacts: "Where Are the Elderly People? Knowledge Against COVID-19", "The COVID-19 Pandemic's Immediate Impact on Brazilian Economic Classes", "The Pandemic's Effects on the Brazilian Labor Market: Inequalities, Labor Ingredients and the Role of the Working Week", "COVID-19, Economic Classes and the Middle Way: Developments in the Crisis up to August 2020"; and "Time for School in the Pandemic".

FGV Social was also one of the organizers of the second international event on "Population, Poverty and Inequality", in partnership with the International Union for The Scientific Study of Population (IUSS). This event took place in December 2020 in Paris, and it was completely online because of the pandemic. During it, more than 650 academic papers were submitted and assessed. FGV Social is part of a group created by the Institute of Social Research (ISR) at the University of

Michigan, which hosted the first meeting in 2019. ISR is a leader in the generation of household surveys and links with administrative records, as well as in the development and application of new social science methods. This group of academics held the International Research Conference on Population, Poverty and Inequality.

For more information, visit fgv.br/fgvsocial.

Transportes

Center for Transport, Logistics and Urban Mobility Studies
Director: Marcus Vinicius Quintella Cury

Through its Center for Transport, Logistics and Urban Mobility Studies, FGV seeks to present itself as a natural candidate to study and strategically think about the transportation market, given that it is recognized throughout Brazil for its neutrality with regard to analytical, academic and technical positions, especially in the areas of economics, administration, law, the social sciences and mathematics.

This center was created in 2019 in order to foster links with the freight and passenger transportation industry, in both public and private sectors. In a structured way, it seeks to promote applied research, publications, seminars, debates, technical reports, statistics, studies and projects.

In 2020, Transportes accompanied FGV's digital transformation, holding 19 webinars on key topics about transport, logistics and urban mobility, featuring public officials and senior executives from private companies and industry associations. It also participated as a guest in eight livestreams hosted by major players in the national and international transportation market. In addition, Transportes has been productively using digital videoconferencing platforms for internal administrative and academic matters and for corporate project development meetings with clients.

For more information, visit fgv.br/transportes.

I – CORPORATE CENTERS

1. CERI – Center for Regulation and Infrastructure Studies (2014)
- Coordination: Joisa Dutra

2. FGV Social – Center for Social Policy (2000)
- Coordination: Marcelo Neri

3. DAPP – Department of Public Policy Analysis (2011)
- Coordination: Marco Aurelio Ruediger

4. FGV Energy – Center for Energy Studies (2013)
- Coordination: Carlos Quintella

5. NPII – International Intelligence Unit (2011)
- Coordination: Renato Flôres

6. DENN – Business Studies Division (2012)
- Coordination: Antônio Carlos Pôrto Gonçalves

7. FGV Growth and Development – Center for Economic Growth and Development Studies (2014)
- Coordination: Pedro Cavalcanti Ferreira and João Victor Issler

• FGVnest – Center for Studies on Startups, Innovation, Venture Capital and Private Equity (2018)
Coordination: Caio Ramalho

8. CDMC – Center for the Development of Mathematics and Science (2017)
- Coordination: César Camacho

9. DGPE – Center for the Development of Public Management and Educational Policy (2018)
- Coordination: José Henrique Paim Fernandes

10. FGV BJIS – Brazil-Japan Center for Innovation and Sustainability (2019)
- Coordination: Edson Kondo

11. Transportes (2018)
- Coordination: Marcus Quintella

12. Center for Technology and Development (2018)
- Coordination: Ciro Biderman

13. Center for Empirical Economics Studies (2018)
- Coordination: Cecília Machado

14. CCAS – Center for Science Applies to Public Security (2020)
- Coordination: Joana Monteiro

II – INTERDISCIPLINARY CENTERS

15. CEPESP – Center of Politics and Economics of the Public Sector (2006)
- Coordination: George Avelino Filho and Ciro Biderman
*Center integrated with EAESP, EESP and EBAPE

16. NFC – Nucleus for Behavioral Finance (2014)
- Coordination: Claudia Yoshinaga and William Eid Junior
*Center integrated with EAESP's FGVcef and EESP

III – INTRA-UNIT CENTERS

FGV EAESP – SAO PAULO SCHOOL OF BUSINESS ADMINISTRATION

17. CEAPG – Center for Public Administration and Government Studies (1989)
- Coordination: Fernando Burgos

18. Finance Institute (2012)
- Coordination: Antonio Gledson de Carvalho

19. FGVcef – Finance Research Center (2001)
- Coordination: William Eid Junior, Ricardo Rochman and Claudia Yoshinaga

20. FGVcepe – Private Equity and Venture Capital Research Center (2003)
- Coordination: Newton Campos

21. FGVces – Center for Sustainability Studies (2003)
- Coordination: Mario Monzoni

22. FGVcev – Center for Retailing Excellence (2001)
- Coordination: Maurício Morgado

23. FGVcia – Center for Applied Information Technology (1990)
- Coordination: Alberto Albertin

24. FGVsaúde – Center for Health Planning and Management Studies (1989)
- Coordination: Ana Maria Malik

25. FGVcelog – Center for Excellence in Logistics and Supply Chain (2005)
- Coordination: Priscila Laczynski de Souza Miguel

26. FGVcenn – Center for Entrepreneurship and New Ventures (2004)
- Coordenação: Edgard Roger Barki

27. Innovation Center (2000)
- Coordination: Susana Carla Farias Pereira

28. FGVcei – Center for International Competitiveness Studies (2014)
- Coordination: Maria Tereza Leme Fleury

29. FGVredes – Center for Communication, Marketing and Social Networks (2012)
- Coordination: Lilian Soares Pereira Carvalho

30. NEOP – Center for Organization and People Studies (2012)
- Coordination: Maria José Tonelli

31. FGVethics – Center for Ethics, Transparency, Integrity and Compliance Studies (2019)
- Coordination: Ligia Maura Costa

32. CND – Center for Studies on New Developmentalism (2005)
- Coordination: Nelson Marconi and Luiz Carlos Bresser-Pereira

33. FGVcemif – Center for Microfinance and Financial Inclusion Studies (2007)
- Coordination: Lauro Emilio Gonzalez Farias

34. CEISA – Center for Infrastructure and Environmental Solutions (2003)
- Coordination: Gesner de Oliveira

FGV EESP – SAO PAULO SCHOOL OF ECONOMICS

35. C-MICRO – Center for Applied Microeconomic Studies (2009)
- Coordination: André Portela Fernandes de Souza and Lycia Lima

• CLEAR – Center for Learning on Evaluation and Results for Brazil and Lusophone Africa (2015)
Coordination: Lycia Lima

• LEARN – Lab for Evaluation, Analysis and Research in Learning (2014)
Coordination: Vladimir Pinheiro Ponczek

36. CEQEF – Center of Quantitative Studies in Economics and Finance (2008)
- Coordination: Pedro Luiz Valls Pereira

37. CEMAP – Center for Applied Macroeconomic Studies (2004)
- Coordination: Emerson Fernandes Marçal

• Center for Foreign Exchange and Trade Monitoring (2012
Coordination: Emerson Fernandes Marçal

38. FGV Agro – Center for Agribusiness Studies (2003)
- Coordination: Roberto Rodrigues

39. Center for Macroeconomic Research on Brazil (2013)
- Coordination: Marcelo Kfoury Muinhos

40. CCGI – Center for Studies in Global Trade and Investments (2010))
- Coordination: Vera Thorstensen

• Center for Modeling (2010)
Coordination: Lucas Ferraz

41. CEAS – Center for South Atlantic Studies (2014)
- Coordination: Luiz Felipe de Alencastro

42. State-Owned Company Observatory (2017)
- Coordenação: Márcio Holland

43. NDS – Data Science Study Center (2018)
- Coordination: Afonso de Campos Pinto and Élia Yathie Matsumotoo

44. FGV INVEST – Center for Studies in Investment Processes (2012)
- Coordination: Paulo Tenani

FGV DIREITO SP – SAO PAULO LAW SCHOOL

45. Nucleus for Justice and Constitutional Affairs (2010)
- Coordination: Dimitri Dimoulis and Luciana Gross

46. Nucleus for Global Law and Development (2008)
- Coordination: Michelle Ratton and Salem Nasser

47. Nucleus for Law, Economics and Governance (2013)
- Coordination: Mariana Pargendler

48. Nucleus for Fiscal Studies (2009)
- Coordination: Eurico Di Santi

49. Nucleus for Market and Investment Studies (2012)
- Coordination: Ary Oswaldo Mattos Filho and Viviane Muller

50. Nucleus for Crime and Punishment Studies (2005)
- Coordination: Maíra Machado and Marta Machado

51. Nucleus for Tax Law for Professional Master's Degree (2014)
- Coordination: Tathiane Piscitelli

52. Law, Gender and Identity Group (2011)
- Coordination: Ligia Sica

53. Public Group (2017)
- Coordination: Carlos Ari Sundfeld and Juliana Bonacorsi de Palma

54. Economic Criminal Law Group for Professional Master's Degree (2012)
- Coordination: Heloisa Estellita

55. Freedom of Expression Group (2018)
- Coordination: Ronaldo Porto Macedo

56. Center for Human Rights and Companies (2013
- Coordination: Flávia Scabin

57. Center for Education and Research in Innovation (2012)
- Coordination: Marina Feferbaum and Alexandre Pacheco

FGV EBAPE – BRAZILIAN SCHOOL OF PUBLIC AND BUSINESS ADMINISTRATION

58. CBR – Center for Behavioral Research (2013)
- Coordination: Eduardo Andrade

59. CBFR – Center for Banking and Finance Research in Rio (2016)
- Coordination: Lars Norden

60. CEIPE – Center for Excellence and Innovation in Education Policies (2016)
- Director: Claudia Costin

61. Applied Research Center in Accounting and Analytics (2019)
- Coordination: Ricardo Lopes Cardoso

FGV EPGE - EPGE BRAZILIAN SCHOOL OF ECONOMICS AND FINANCE

62. CEA – Center for Applied Economics (2002)
- Coordination: Aloisio Araújo

FGV DIREITO RIO – RIO DE JANEIRO LAW SCHOOL

63. CJUS – Center for Justice and Society (2004)
- Coordination: Michael Freitas Mohallem

64. CTS – Center for Technology and Society (2003)
- Coordination: Antônio José Maristrello Porto

• Center for Data (2019)
Coordination: No coordinator yet

65. CPDE – Center for Research in Law and Economics (2009)
- Coordination: Antônio José Maristrello Porto

• Brazil-China Program (2017)
Coordination: Evandro Menezes de Carvalho

• Center for Advanced Studies in Financial System Regulation (2018)
Coordination: Antônio José Maristrello Porto and João Manoel de Lima Junior

• Law and Environment Program (2017)
Coordination: Sérgio Guerra and Antônio José Maristrello Porto

• NAPS – Center for Advanced Studies in Health Regulation (2020)
Coordination: Flavia Bahia

• Center for Advanced Studies in Tax Regulation (2020)
Coordination: Gustavo Schneider Fossati

• Center for Studies in Corporate Law and Arbitration (2020)
Coordination: Márcio Guimarães

66. Diversity Program (2017
- Coordination: Ligia Fabris

FGV CPDOC – SCHOOL OF SOCIAL SCIENCES

67. FGV Opinion (2000)
- Coordination: Márcio Grijó Vilarouca

68. LAPES – Laboratory for Social Thought (2008)
- Coordination: João Marcelo Ehlert Maia and Bernardo Buarque de Hollanda

69. LEH – Laboratory for Teaching History (2013)
- Coordination: Américo Freire, Martina Spohr Gonçalves and Vivian Fonseca

70. LEI – Laboratory for the Study of Institutions (2014)
- Coordination: Angela Moreira Domingues da Silva and Marco Aurélio Vannucchi

71. LEM – Laboratory for Studies of the Military (2010)
- Coordination: Celso Castro

72. LEP – Laboratory for Political Studies (2009)
- Coordination: Américo Freire and Márcio Grijó Vilarouca

73. LESP – Laboratory for Sports Studies (2013)
- Coordination: Bernardo Buarque de Hollanda, Jimmy Medeiros and Vivian Fonseca

74. LET – Laboratory for Tourism Studies (2008)
- Coordination: Celso Castro

75. LHuD – Digital Humanities Lab (2016
- Coordination: Juliana Marques

76. Audiovisual and Documentary Center (2006)
- Coordination: Adelina Novaes Cruz and Thais Blank

77. LECV – Laboratory for Visual Culture Studies (2018
- Coordination: Thais Blank

FGV IBRE – BRAZILIAN INSTITUTE OF ECONOMICS

78. Center for Applied Economics (2010)
- Coordination: Armando Castelar Pinheiro

• Economic Growth and Development
Coordination: Fernando Augusto Adeodato Veloso, Armando Castelar, Samuel Pessôa and Nelson Barbosa

• External Sector Studies
Coordination: Lia Valls Pereira

• Monetary Studies
Coordination: José Júlio Senna

• Infrastructure
Coordination: Armando Castelar

• Fiscal Policy
Coordination: José Roberto Rodrigues Afonso

• Macroeconomic Forecasts and Studies
Coordination: Silvia Maria Matos

INTERNATIONAL

HIGHER EDUCATION INSTITUTION PARTNERS

Source: International Affairs Division (FGV DINT)

ARGENTINA

- Universidad Austral
- Universidad de San Andrés
- Universidad Nacional de San Martín
- Universidad Torcuato Di Tella

AUSTRALIA

- Macquaire University
- The University of Sydney
- University of New South Wales

AUSTRIA

- IMC University of Applied Science Krems
- Vienna University of Economics and Business - WUU

BELGIUM

- KU Leuven
- Université Catholique de Louvain
- Université Libre de Bruxelles
- University of Antwerp – School of Law

CANADA

- HEC - Montreal
- McGill University
- Queen's University
- Université du Québec à Montréal
- Université Laval
- University of British Columbia
- University of Calgary
- University of Manitoba
- University of Victoria - Peter B. Gustavson School of Business
- University of Western Ontario
- York University

CHILE

- Pontificia Universidad Católica de Chile
- Universidad Adolfo Ibañez
- Universidad de Chile

CHINA

- China University of Political Science and Law
- Chinese Academy of Social Sciences - CASS
- FUDAN University
- Peking University
- Renmin University
- The Hong Kong University of Science and Technology
- Tianjin University
- Tsinghua University
- Xiamen University

COLOMBIA

- Universidad Los Andes

CZECH REPUBLIC

- University of Economics, Prague

DENMARK

- Copenhagen Business School (CBS)
- University of Copenhagen

ECUADOR

- Universidad Andina Simon Bolivar

FINLAND

- Aalto University

FRANCE

- Ecole Nationale d'Administration (ENA)
- École supérieure de commerce de Pau (ESC PAU)
- EDHEC Business School
- EM Strasbourg Business School
- EMLYON Business School
- ESCP Europe
- ESSEC Business School
- Grenoble École de Management
- HEC Paris
- Institut National de Recherche en Informatique et en Automatique (INRIA)
- Montpellier Business School
- NEOMA Business School
- Sciences Po Grenoble
- Sciences Po Lille
- Sciences Po Paris
- Toulouse Business School (TBS)
- Université Clermont Auvergne
- Université Paris II Panthéon-Assas
- Université Paris - Dauphine
- Université Paris - Sorbonne
- Université Toulouse 1 Capitole

GERMANY

- Albert-Ludwigs-Universität Freiburg
- Bucerius Law School – Hochschule fur Rechtswissenschaft
- Dresden University of Technology (TU Dresden)
- EBS Universitat fur Wirtschaft und Recht
- Frankfurt School of Finance and Management
- Freie Universität Berlin - School of Business & Economics and Law Department
- German Institut of Global and Area Studies
- Global Public Policy Institute
- Goethe University Frankfurt am Main - Institute for Law and Finance
- Hamburg School of Business Administration
- Hertie School of Governance
- Julius Maximilian University of Würzburg
- Kühne Logistics University
- Pforzheim University
- Reutlingen University
- TUM - Technische Universität München
- Universität Hamburg
- Universität Mannheim
- Universität zu-Köln
- Weierstrass Institute (WIAS Berlin)
- Westfälische Wilhelms-Universität Münster
- WHU Koblenz

HUNGARY

- Corvinus University of Budapest

INDIA

- Indian Institute of Management Ahmedabad (IIMA)
- Indian Institute of Management Bangalore (IIMB)
- Indian Institute of Management Calcuta (IIMC)
- O.P. Jindal Global University

INDONESIA

- Universitas Indonesia

IRELAND

- University College Dublin - Michael Smurfit Graduate Business School

ISRAEL

- IDC Herzliya

Tel Aviv University

ITALY

- Bocconi University
- Fondazione Bruno Visentini
- International University College of Turin
- Libera Università Internazionale degli Studi Sociali Guido Carli (LUISS)
- Università Catolica del Sacro Cuore (UCSC)
- Università degli Studi di Bergamo
- Università degli Studi di Pavia

- Università degli Studi di Roma "Tor Vergata"
- Universitá degli Studi di Salerno
- Università degli Studi di Torino

JAPAN

- Hiroshima University of Economics
- Keio University
- Nagoya University
- Ritsumeikan University
- The University of Tokyo
- Waseda University

KOREA

- Korea University Business School (KUBS)
- Sungkyunkwan University (SKK)
- Yonsei University School of Business

LEBANON

- American University of Beirut

MEXICO

- Centro de Investigación y Docencia Económicas (CIDE)
- El Colegio de México
- Instituto Tecnológico Autónomo de México (ITAM)
- Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM)

NETHERLANDS

- Erasmus Universiteit Rotterdam
- Tilburg University
- Universität Maastricht
- Universiteit van Amsterdam

NEW ZEALAND

- The University of Auckland
- University of Otago

NORWAY

- BI Norwegian School of Management
- Norwegian School of Economics (NHH)
- University of Oslo

PERU

- ESAN
- Pontificia Universidad Católica de Perú
- Universidad Católica San Pablo
- Universidad Nacional Mayor de San Marcos
- Universidad San Ignacio de Loyola

POLAND

- SWPS University of Social Sciences and Humanities
- Warsaw School of Economics (SGH)

PORTUGAL

- Instituto Universitário de Lisboa (ISCTE)
- Universidade Católica Portuguesa Lisboa
- Universidade Católica Portuguesa Porto
- Universidade de Coimbra
- Universidade de Lisboa
- Universidade Nova de Lisboa

RUSSIA

- National Research University – Higher School of Economics
- St. Petersburg State University

SINGAPORE

- National University of Singapore
- Singapore Management University (SMU)

SPAIN

- ESADE
- IE Business School
- Universidad Autónoma de Madrid
- Universidad Carlos III de Madrid
- Universidad de Cantabria
- Universidad Francisco di Victoria
- Universitat Autónoma de Barcelona (UAB)
- Universitat Pompeu Fabra

SOUTH AFRICA

- University of Cape Town GSB UCT
- University of Pretoria

SWEDEN

- Stockholm School of Economics
- Stockholm University
- Umea Universitet

SWITZERLAND

- EU Business School
- University of St. Gallen
- ZHAW School of Management and Law

TAIWAN

- National Chengchi University

TURKEY

- Bilkent University
- Koç University
- Yasar University

UNITED KINGDOM

- Cranfield University
- King's College London
- Lancaster University
- London Business School
- London School of Economics and Political Science (LSE)
- Queen Mary University
- Regent´s University London
- The University of Manchester
- The University of Warwick
- The University of York
- University College London -UCL
- University of Bristol
- University of Edinburgh
- University of Essex

UNITED STATES OF AMERICA

- American University
- Babson College
- Boston University
- Brandeis University
- Brigham Young University (BYU)
- Carnegie Endowment for International Peace
- Columbia University
- Cornell University
- Duke University
- Emory University
- Florida International University
- Fordham University – School of Law
- Georgia Institute of Technology
- Gonzaga University – School of Law
- Harvard Law School
- Indiana University
- Michigan State University
- New York University
- Northeastern University
- Northwestern University
- Pace University of Law
- Pennsylvania State University
- Pepperdine University
- Purdue University
- San Diego State University
- Texas A&M University
- The University of Notre Dame Du Lac
- The University of Texas at Austin
- The William and Flora Hewlett Foundation
- Tulane University
- University of California, Davis

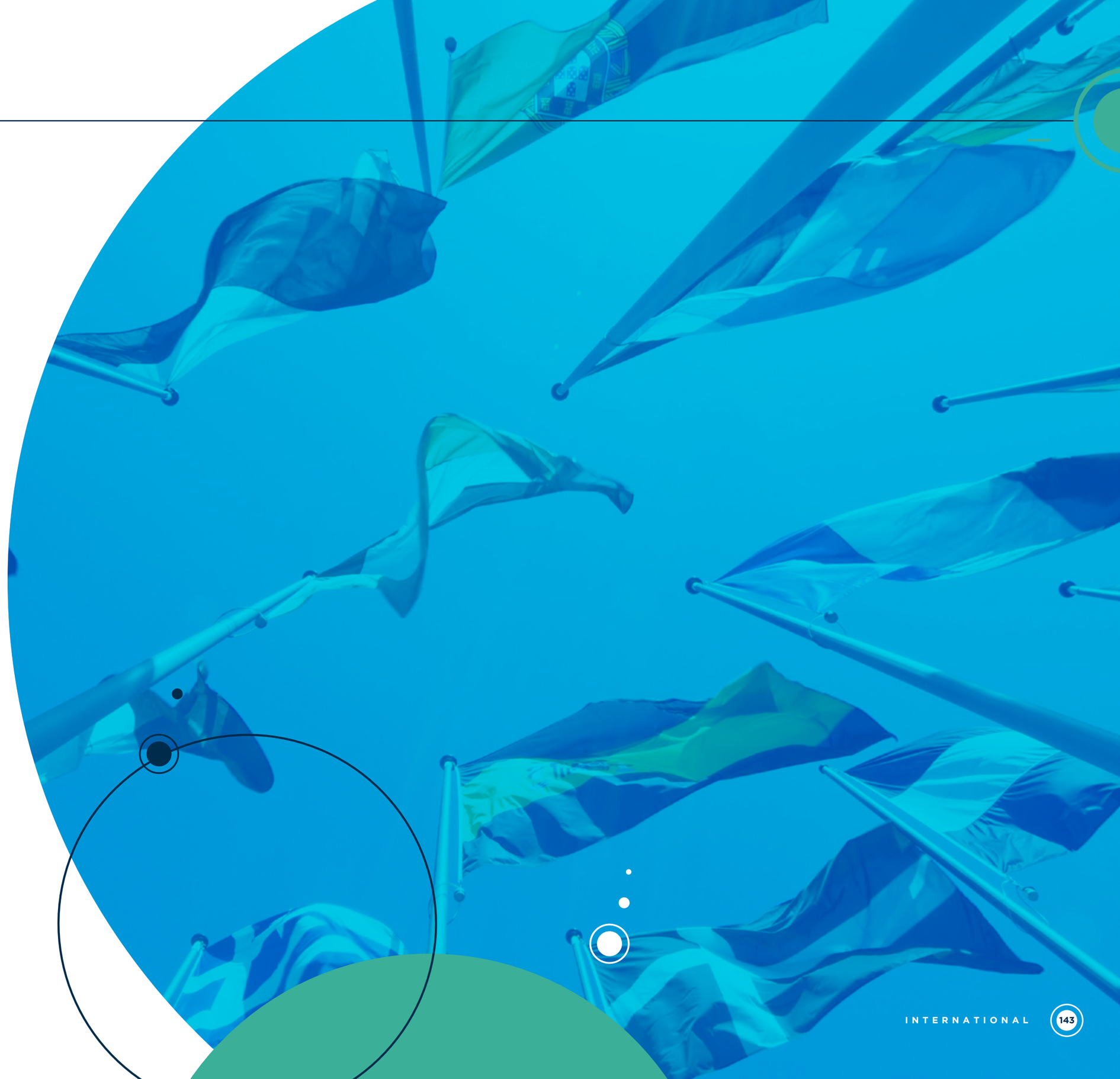
- University of Minnesota
- University of North Carolina at Chapel Hill
- University of San Diego
- University of South Carolina
- University of Southern California
- University of Virginia - McIntire School of Commerce
- University of Wisconsin-Madison - Law School
- Vanderbilt University
- Woodrow Wilson International Center for Scholars
- Yale University
- University of California, San Diego
- University of Chicago
- University of Florida
- University of Illinois at Chicago
- University of Illinois at Urbana-Champaign
- University of Miami

URUGUAY

- Universidad de Montevideo
- Universidad ORT Uruguay

VENEZUELA

- Instituto de Estudios Superiores de Administración (IESA)



ORGANIZATIONAL STRUCTURE

TOP MANAGEMENT

FIRST PRESIDENT AND FOUNDER
- Luiz Simões Lopes (1944-1992)

SECOND PRESIDENT
- Jorge Oscar de Mello Flôres (1992-2000)

PRESIDENT
- Carlos Ivan Simonsen Leal (2000 to date)

VICE PRESIDENTS
- Francisco Oswaldo Neves Dornelles (on leave)
- Marcos Cintra Cavalcanti de Albuquerque

PROVOST FOR EDUCATION, RESEARCH AND GRADUATE STUDIES
- Antonio de Araujo Freitas Júnior

BOARD OF DIRECTORS

Members
- Armando Klabin
- Carlos Alberto Pires de Carvalho e Albuquerque
- Cristiano Buarque Franco Neto
- Ernane Galvêas
- José Luiz Miranda
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- Rubens Mario Alberto Wachholz

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FGV Social – Center for Social Policy
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Transportes – Center for Transport,
Logistics and Urban Mobility Studies
- Marcus Vinicius Quintella Cury

BALANCE SHEET

BALANCE SHEET

As of December 31, 2020 and 2019 (in million reais)

ASSETS	2020	2019
CURRENT	**874.23**	**907.74**
CASH AND CASH EQUIVALENTS	685.62	680.19
Uncommitted resources	613.70	646.41
Committed resources	71.92	33.78
ACCOUNTS RECEIVABLE	104.12	88.18
REIMBURSABLE SCHOLARSHIPS	21.46	30.70
STOCKS	3.81	5.24
ADVANCE PAYMENTS TO EMPLOYEES	9.39	10.21
ADVANCE PAYMENTS FOR GOODS AND SERVICES	3.12	45.98
JUDICIAL AND LABOR DEPOSITS	16.53	14.25
OTHER CREDITS TO RECEIVE	30.17	32.99
NONCURRENT	**770.56**	**768.20**
NONCURRENT RECEIVABLES	250.69	245.14
Committed financial investments	27.12	61.87
Reimbursable scholarships	86.19	62.80
Judicial deposits	137.38	120.46
PROPERTY, PLANT AND EQUIPMENT AND NET INTANGIBLE ASSETS	519.87	523.06
Property, plant and equipment and net intangible assets	724.66	700.76
(-) Depreciation and amortization	(204.79)	(177.70)
TOTAL ASSETS	**1,644.79**	**1,675.94**

LIABILITIES AND OWNERS' EQUITY	2020	2019
CURRENT	**262.21**	**301.61**
LOANS AND FINANCING	9.91	13.51
SUPPLIERS	54.17	84.63
SALARIES PAYABLE, CONTRIBUTIONS AND WITHHOLDINGS	42.87	97.84
MISCELLANEOUS PROVISIONS	52.25	48.52
AGREEMENTS AND CONTRACTS	71.74	33.71
REVENUE TO APPROPRIATE	6.42	6.42
RENT TO PAY	15.64	14.77
OTHER LIABILITIES	9.21	2.22
NONCURRENT	**307.67**	**265.49**
LOANS AND FINANCING	45.81	55.47
REVENUE TO APPROPRIATE	3.74	10.16
RENT TO PAY	18.26	33.71
PROVISION FOR LABOR, CIVIL AND TAX RISKS	57.59	17.15
PENSION OBLIGATIONS PAYABLE	138.77	121.87
PROVISION FOR POST-EMPLOYMENT BENEFITS	43.50	27.13
OWNERS' EQUITY	**1,074.90**	**1,108.85**
EQUITY	988.08	1,001.20
SPECIAL FUNDS	168.71	149.33
ACCUMULATED (DEFICIT)	(38.19)	(12.83)
OTHER RELEVANT RESULTS	(43.70)	(28.85)
TOTAL LIABILITIES AND OWNERS' EQUITY	**1,644.79**	**1,675.94**

INCOME STATEMENT

As of December 31, 2020 and 2019 (in million reais)

	2020	2019
NET OPERATING REVENUE	**1,158.09**	**1,340.91**
COST OF SERVICES PROVIDED	**(777.61)**	**(994.64)**
GROSS INCOME	**380.48**	**346.27**
ADMINISTRATIVE EXPENSES	**(425.06)**	**(387.64)**
Staff costs	(203.18)	(194.20)
General and administrative expenses	(42.50)	(60.97)
Services	(89.30)	(74.43)
Other administrative expenses	(90.08)	(58.04)
INCOME BEFORE FINANCIAL REVENUES AND EXPENSES	**(44.58)**	**(41.37)**
Financial revenues	19.89	44.05
Financial expenses	(13.50)	(15.52)
(DEFICIT) IN FINANCIAL YEAR	**(38.19)**	**(12.83)**

FUNDAÇÃO GETULIO VARGAS

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