

Data-Driven Digital Innovation to Strengthen Integrity: TCU's Payroll Oversight in Brazil

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**DATA-DRIVEN DIGITAL INNOVATION
TO STRENGTHEN INTEGRITY:
TCU'S PAYROLL
OVERSIGHT IN BRAZIL**

ABSTRACT

DATA-DRIVEN DIGITAL INNOVATION TO STRENGTHEN INTEGRITY: TCU'S PAYROLL OVERSIGHT IN BRAZIL *

This technical note documents the Continuous Payroll Audit Initiative within Brazil's Court of Accounts (Tribunal de Contas da União, or TCU), presents its lessons learned and makes recommendations that could improve its results. This initiative uses digital tools such as data analytics to proactively identify and address incorrect and/or illicit payments in the federal civil service and pension payroll. As of 2021, the initiative had led to savings close to R\$2 billion (US\$515 million). The study demonstrates that a small team using the right technology can be very effective in rooting out irregularities in a complex system. However, technological innovation is not sufficient to address these issues. Broader systemic reforms in information collection and compliance are required for the system to fully achieve its goals. Given these results, this case could serve as reference for other supreme audit institutions around the world that are seeking to combat fraud and corruption.

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KEYWORDS: supreme audit institutions, digital government, payroll management, corruption, government control, innovation, Brazil

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CONTENTS

Acronyms	03
Executive Summary	04
1. Context: The Court of Accounts and Its Role in Auditing Management of the Payroll	15
2. The System for Continuous Oversight of the Payroll	20
The Four Steps of FCFP	22
FCFP's Estimated Financial Benefits	31
3. International Experiences	33
4. Opportunities and Challenges	37
5. Conclusions and Recommendations	47
References	54



ACRONYMS

AI	Artificial intelligence
CGU	Internal auditor of the government (Controladoria Geral da União)
DESIN	Department of Digital Solutions and Management Information
e-Pessoal	System of Personnel Actions (Sistema de Atos de Pessoal)
FCFP	Continuous Payroll Audit Initiative (Fiscalização Contínua de Folhas de Pagamento)
GAO	Government Accountability Office – United States of America
IDB	Inter-American Development Bank
INTOSAI	International Organization of Supreme Audit Institutions
NAO	National Audit Office – United Kingdom
NFPS	Non-financial public sector
OPM	Office of Personnel Management – United States of America
RAIS	Annual Report of Social Information (Relatório Anual de Informações Sociais)
SEFIP	Secretariat of External Control for Personnel Actions and Social Benefits (Secretaria de Fiscalização de Atos e Pagamentos de Pessoal e de Benefícios Sociais)
SGP	Secretariat of Personnel Management of the Ministry of Economy (Secretaria de Gestão e Desempenho de Pessoal)
SIAPE	Integrated System for Personnel Administration (Sistema Integrado de Administração de Pessoal)
SOE	State-owned enterprise
SQL	Structured query language
TCE	State-level Courts of Accounts (Tribunais de Contas dos Estados)
TCM	Municipal-level Courts of Accounts (Tribunais de Contas dos Municípios)
TCU	Federal Court of Accounts (Tribunal de Contas da União)

EXECUTIVE SUMMARY

Brazil's Federal Court of Accounts (Tribunal de Contas da União, or TCU) is the external control institution of the federal government that supports the national congress by overseeing the budget and its financial execution. As detailed in Article 70 of the 1988 Constitution, Organic Laws, Norms, and Ordinances, the TCU is responsible for accounting, financial, budget, performance, and property oversight of public bodies and entities of the country to ensure their legality, legitimacy, and best value.

The TCU has been one of the most innovative supreme audit institutions in Latin America and the Caribbean, pioneering the use of digital tools to transform the practice of external control. Among these initiatives, LabContas—TCU's Information and Control Lab—has been leading cutting-edge initiatives and sharing its experience across the region. Digital Transformation is one of the key pillars of TCU's vision in the context of Brazil's presidency of INTOSAI from 2022 to 2025. This technical note documents the Continuous Payroll Audit Initiative by the TCU (**the Fiscalização Contínua de Folhas de Pagamento, or FCFP**), presents its lessons learned, and identifies recommendations that could improve its results. This innovative program uses digital tools, data analytics, and institutional partnerships to proactively identify and address incorrect payments. From 2015 through 2021, this led to cumulative savings of close to R\$2 billion (US\$515 million).

Given the size and complexity of Brazil's civil service payroll—and the fact that public salaries are a leading driver of overall public spending in Brazil—the TCU launched the FCFP in 2015 to establish a system of continuous oversight using innovative digital tools. The overall objective is to audit and monitor resources that are spent through the public payroll to assure that they are used in conformity with the laws and regulations governing remuneration and benefits of civil servants and those on civil servant pensions.¹ The primary focus and authority of the TCU is over the federal administration; its oversight is mandatory for all federal agencies. However, the TCU has had some interaction with state and local

¹ TCU's Normative Instruction No. 84/2020 establishes that from 2020, accounts will need to be audited through an integrated financial audit. Accounts should be presented objectively and clearly, with accuracy of statements in the legality, legitimacy, and economy of management actions, including those related to the payroll.

external control agencies to share databases and to provide information on the FCFP system. Through the development and linking of databases, monthly receipt of data, development of panels of management data, and tools for automated analysis of the data, the TCU has been able to identify an increasing number of irregularities across a broader number of government agencies.

The FCFP has developed control techniques that survey and share information with the audited agency so that the agency itself is able to take preventive and, if necessary, corrective actions when irregularities are detected. Providing agencies with information and accompanying them in the resolution of irregularities produced stronger incentives to address irregularities, created more constructive relations with audited entities, and increased the scale and effectiveness of the TCU's work. Prior to 2015, the TCU carried out payroll audits of 1–10 jurisdictional units or agencies per year. In 2021 alone, the FCFP was able to oversee the payroll of 594 federal entities and provide information on 39 different types of irregularities, generating savings of R\$405 million or 0.1 percent of the total audited payroll.²

The TCU Secretariat of External Control for Personnel Actions and Social Benefits (Secretaria de Fiscalização de Atos e Pagamentos de Pessoal e de Benefícios Sociais, or SEFIP), which is responsible for the development of the FCFP, has continuously evolved and improved the system. In 2015, data and clarifications were still being received in the form of spreadsheets from some entities. In 2017, systems were introduced to receive data automatically and to better manage cases of irregularities. In 2018, a shift was made to enable monthly receipt of data and the payroll, making the process continuous as opposed to the examination of a snapshot at one point in the year. In 2019, systems were developed to create management information panels, allowing for easier access to information and markers of progress on individual issues. In 2020, tools were deployed to use automated analysis of the clarifications provided by agencies, and in 2021 communication was intensified to prompt corrective actions by the agencies experiencing consistent irregularities. The FCFP is a living system in that it is continuously undergoing iterative improvement and revisions in order to improve its effectiveness.

The basic process of the FCFP has four principal steps: (i) obtaining data, (ii) the application of “audit trail” programs and the analysis of the data suggesting irregularities, (iii) seeking clarifications on irregularities from the jurisdictional

² See <https://portal.tcu.gov.br/imprensa/noticias/tcu-analisa-gestao-das-folhas-de-pagamento-de-orgaos-federais.htm>.

units, and (iv) analysis of the clarifications provided by these units and preparation of the audit report. Data comes from three key databases: the Integrated System for Personnel Administration (Sistema Integrado de Administração de Pessoal, or SIAPE) has consistently been the source of data for about 200 entities; Extra-SIAPE (the database of the payrolls of bodies and entities of the union that do not use SIAPE) furnishes data for about 84–88 entities; and the Annual Report of Social Information (Relatório Anual de Informações Sociais, or RAIS) generates data for about 300 additional federal entities. State and local data may also be provided through agreement with state and local control entities. The SIAPE database is automatically uploaded from the Ministry of Economy by the TCU. Extra-SIAPE and RAIS databases must be submitted by the audited entities on a regular basis. The quality and consistency of the data is fundamental to the proper identification of irregularities and significant efforts have been made through LabContas and SEFIP to harmonize and improve the data used in the FCFP.

Once the databases are ready, automated programs that cross-check the data are applied based on 39 audit trails to identify irregularities. Irregularities may arise for several reasons. There can be discrepancies in the data regarding information that should be consistent. There can be payments made that do not comply with relevant laws and are therefore illegal. There may also be payments made that are legal payments but are either duplicates (for example, two individuals who are married may both work for the civil service and may receive a benefit for the same child twice) or of an incorrect amount (for example, exceeding the salary cap for a specific position). Some irregularities may be based on a simple oversight, whereas some may derive from intentional behavior on the part of civil servants.

Each of these audit trails is documented, specifying the legal criteria on which it is based, the analysis procedure, and the technical procedure for carrying out the analysis. From 2015 through 2021, a total of 415,125 irregularities were identified as the number of audit trails expanded. The largest share (45.8 percent) of irregularities falls under the category of illicit or incompatible accumulations of positions, jobs, functions, and/or pensions, meaning that individuals have or are receiving more of these than is allowed. The next largest category (32.1 percent) is “undue payments,” in which individuals received payments that they were not entitled to. “Inconsistencies in personnel acts or in registration” account for 7.6 percent of the irregularities and “violations of the salary ceiling” for 4.5 percent.

Once the data is obtained and analyzed, the next phase is to contact jurisdictional units to clarify irregularities. On average, the response rate of the units that were contacted over the 2015–2021 period was 50 percent. In 2020 and 2021, 33 and 42 percent of the irregularities identified received responses,

respectively. Of the responses received, on average, about 40 percent of irregularities were accepted and regularized and 36 percent were shown to be false positives (that is, irregularities that turn out not to be real). One reason for the lower-than-desired response rate from jurisdictional units is the learning curve: many of them were still not registered with the FCFP system and familiarized with its procedures. Another factor relates to the high number of cases and the need for the jurisdiction to investigate each case individually every month. It can be difficult to obtain information from individual citizens, some of whom appeal to the court system in order to maintain their benefits, whether they qualify for them or not. Agencies of the public administration generally are inclined to give ample opportunity for citizens to defend themselves against claims of irregular payments or benefits. A separate issue relates to shortages of qualified staff to analyze each case, particularly during these recent years of COVID-19.

In 2017, the System of Personnel Actions (Sistema de Atos de Pessoal do TCU, or e-Pessoal) was made available for use as an automated platform to provide clarifications by working in the system to note observations or justifications, highlight legal foundations in support of the payments or benefits, and to annex supporting documents. The introduction of this system made it possible to manage the whole life cycle of a piece of evidence detected in an audit, from its initial identification through the provision of clarifications by the jurisdictional unit, to the ultimate corrective measures given by the TCU. This capability has been essential to monitoring progress in resolving individual cases. Given the large number of cases identified, this functionality is essential to automating the workflow associated with monitoring each case through to its final resolution. However, such tools do not by themselves overcome the difficulty of getting responses on clarifications and advancing the resolution of irregularities when jurisdictions are not responsive. The experience to date suggests that there may be a trade-off between how rapidly the automated system expands and the ability of agencies to address irregularities.

Each year, the TCU meets in plenary to present and review the accompanying report, agree on the findings and follow-up actions (*acórdão*), and vote so that the work of the audit cycle is documented. Although the oversight of the payroll is a continuous process, these reports help to highlight issues and opportunities for the system. They also provide the basis for further actions and agreements among government agencies.

The TCU's development of the FCFP highlights the degree to which technology can be used to share and cross-check information, allowing a deeper understanding of where issues in the payroll may arise. The

assumption is that by providing information on irregularities, the FCFP will prompt agencies to take corrective measures in order to comply with legislation and ultimately save resources. While the TCU has full authority to investigate the use of federal resources and to share information in partnership with state and local external control institutions, it could do more to use the available tools to compel responses to the findings of the system. The experience of the FCFP so far underscores the potential for generating very significant savings for the government if corrective measures are implemented.

The effective financial benefit of the FCFP (defined as the savings stemming from irregularities that have been accepted by the public administration and are either resolved or are in the process of being resolved) has ranged between R\$22 million in 2015 and a high of R\$654 million in 2018. These fluctuations are not surprising because once a particular type of irregularity is identified and resolved, the focus of unethical actors tends to shift to other avenues for seeking illegal benefits. Although this amount is a small share of the total audited payroll and of the total payroll itself, the absolute values are large, totaling over R\$2 billion (or US\$515 million using the annual average exchange rate) since 2015. Moreover, the costs of running the FCFP are very low (salaries for a team of six staff and the cost of licensing the necessary software), so the system has provided excellent value for money to date and has the potential to do much more.

The development of the FCFP reflects a culture of innovation at the TCU that has encouraged problem solving through unconventional approaches that have opened new opportunities for effective action. Since 2015, the technical development of the system has occurred through a process of “learning by doing” and constant efforts to improve the system by a small and highly dedicated team. The continuous development of the technology, along with automated access to the management information system of e-Pessoal, enables partner entities to be proactive and auto-correct issues as they arise. This implies less bureaucracy for those entities willing to engage with the FCFP system and more rapid identification and resolution of irregularities. It can also help to identify areas that require clarification in cases where irregularities may be identified but resolution is not straightforward.

The work on the FCFP by the TCU is part of a broader community of government entities that help to oversee and guide the public payroll in Brazil. The work of the TCU complements the role of other entities charged with overseeing civil service payroll management and oversight. These entities include the comptroller or internal auditor of the government (Controladoria Geral da União, or CGU) through

the Federal Secretariat of Controls (SFC); the Secretariat of Personnel Management of the Ministry of Economy (Secretaria de Gestão e Desempenho de Pessoal, or SGP), including its Department of Digital Solutions and Management Information (Departamento de Soluções Digitais e Informações Gerenciais, or DESIN/SGP/ME); the Department of Personnel Management of the Corporate Management Secretariat of the Ministry of Economy (Diretoria de Gestão Corporativa, or DGP/SGC/ME); and the Division for Remuneration and Benefits in the Special Secretariat at Federal Revenue (Divisão de Remuneração e Benefícios da Coordenação de Gestão de Pessoas da Secretaria Especial da Receita Federal, or DIREM/COGEP/SUCOR/RFB). Discussions with representatives of these entities identified some areas of effective communication and interaction with the TCU-SEFIP team. However, these discussions also indicated that there could be gains to all parts of the system from greater collaboration and understanding of the actions and systems being deployed by other entities. Moving from processes that are relatively siloed to better coordination among these entities could create a stronger force for improving databases and approaches, as well as reducing the duplication of work. Greater coordination might also reduce the burden placed upon government entities to provide responses to the different parts of the system and therefore lead to greater responsiveness and effectiveness of all the systems.

The FCFP system has also created the possibility for greater interaction among control entities and partner entities through virtual online communities, workshops, and conferences. In addition to working with oversight entities and partner governments, there may also be an opportunity to open some aspects of the FCFP system to civil society in order to develop mechanisms for citizen oversight. Such engagement with civil society could help to raise awareness of the TCU's work in overseeing the public payroll and could help to strengthen the demand for greater responsiveness on the part of government entities in resolving key issues.

INTERNATIONAL EXPERIENCES

Exploration of other international experiences in the audit of public payroll suggest that the approach used by the TCU is a singular one. Most governments address audit of payroll as part of the presentation of accounts of specific government bodies rather than as a separate exercise. For example, in the United Kingdom,³ audit work on the payroll is a core part of annual financial review

³ Information based on a conversation with Peter Smithson, Director of Information Technology Audit at the NAO, followed by a short note. We thank him for sharing his insights and knowledge about the NAO's approach to audit of the public payroll.

that the National Audit Office (NAO) carries out for its audited bodies. Most government departments and government-owned organizations operate their own payroll system and outsource the work to third-party providers in the private sector. Likewise, in the United States the Government Accountability Office (GAO) does not draw on data analytics to oversee federal payroll due to issues with data reliability. The Office of Personnel Management (OPM) maintains consolidated personnel and payroll data for government-wide analytics and other functions. More generally, efforts to assess payroll integrity reside within each agency, which limits the potential for carrying out cross-cutting analyses of irregularities.

Therefore, Brazil’s experience with the FCFP could be of interest to other countries that seek to use digital tools for auditing payments—payroll or otherwise. Brazil’s presidency of INTOSAI could help to advance the sharing of knowledge and systems for using digital tools in public payroll oversight. With good data, some degree of centralized oversight, interoperability of digital systems, and a capable team, other countries may also find that they can apply aspects of the innovations developed by the FCFP to their own systems.

OPPORTUNITIES AND CHALLENGES

Despite the impressive accomplishments of the system over the past seven years, several challenges must be addressed for the FCFP system to reach its full potential.⁴ These include the following:

- **COVERAGE AND CONSISTENCY OF DATABASES.** Digital systems that work through a process of cross-checking databases rely heavily on the quality and consistency of the underlying data. Difficulties with coverage and consistency of the database can generate “false positives,” or irregularities that are not necessarily real. False positives have averaged roughly 36 percent of those irregularities that have received responses over the 2015–2022 period. These can reduce the credibility of the system and can lead to wasted time and energy of all involved in investigating.
- **RESPONSIVENESS OF PUBLIC INSTITUTIONS TO THE IRREGULARITIES REPORTED BY THE FCFP.** Although the FCFP makes considerable efforts to facilitate the responsiveness of entities being controlled, there remains a fundamental asymmetry between the cost of identifying irregularities through the automated system—which has diminished almost to zero as the system

⁴ Many of the issues and challenges to be addressed have been noted consistently by the TCU-SEFIP team in its accompanying reports over the years, especially those related to data and responsiveness.

has been improved—and the costs of responding to these irregularities. The resolution of cases requires non-digital as well as digital tools, not least of which is dealing with each case individually, engaging with beneficiaries to understand the situation, and researching the legal basis of a situation that could potentially lead to a judicial case. While entities can insert information and clarifications in one of the modules of FCFP's e-Pessoal system (Módulo Índicios), there is still a need for analog business processes to occur before a case can be resolved. Audited entities may also be subject to similar requests from other control bodies that increase and/or complicate their workload if the requests are not identical. Given these realities, some entities may choose to back away from participation in the system or simply do the best they can with the resources they have, even though cooperation with investigations is obligatory.

- **ADVANCING STRUCTURAL AND POLICY CHANGES.** Through the FCFP system, audit of the public payroll is now able to identify common issues across a very large number of institutions. However, given the nature of the TCU's role and mandate, the focus of the FCFP has largely been on the resolution of individual irregularities. In addition to this valuable function, the FCFP could play a wider and more strategic role in informing discussions on the structural and policy changes that are needed to close gaps and loopholes that allow for irregularities in the payroll to emerge in the first place.
- **SUSTAINABILITY OF THE TEAM AND ITS WORK.** The SEFIP team is a small, agile, and highly dedicated team consisting of six professionals. A challenge for the FCFP in the future is that each staff member brings specialized expertise, so that staff turnover may affect SEFIP's ability to effectively manage the system.
- **LICENSING POLICY.** The main components of the systems that support the work of inspecting the payrolls depend on the licensing policy. There is currently no code-sharing policy with other courts and partners. Instead, the system has a policy for providing external access to tools. The continuity of the FCFP's work thus depends on the pricing policy of the software vendors and solution providers, so that very large changes in product costs may make the model unfeasible in the future.
- **PRIVACY AND CYBERSECURITY.** Although most of the databases used by the FCFP draw on data that is public, the system does access sensitive personal data that is not anonymized, since the TCU is fulfilling a legal obligation backed by the Constitution. The Federal Supreme Court recently weighed in on parameters for sharing data among federal bodies (ADI

6.649 and ADPF 695, September 2022), in a decision that may impact the FCFP's work. With respect to cybersecurity, while the TCU has systems in place to prevent cyberattacks, consideration of the potential implications of a cyberattack on the FCFP system and methods to protect against its impact on public servants is a challenge that the FCFP may wish to take into account in its future work plans.

RECOMMENDATIONS

As the TCU seeks to build on the work carried out to date, it may wish to consider the following recommendations:

RECOMMENDATION 1: Step up the pursuit of integrated and consistent databases.

The system developed to identify and address irregularities in the public payroll is only as good as the data that it receives. The range of federal administration bodies covered by the FCFP—from the executive branch and Congress to the judiciary and the Attorney General's Office—requires a vast amount of information on public positions, salaries, benefits, and schedules to be incorporated into the system, not to mention the oversight of payments to pensioners. Inconsistencies in the databases are the principal explanation for the 36 percent rate of false positives found in the data. The Brazilian government's eSocial platform, a digital bookkeeping system that employers use to report tax, social security, and labor obligations data, could be critical to solving the FCFP's data quality challenges.

RECOMMENDATION 2: Consider measures to improve responsiveness to the system.

While the FCFP system has excelled at highlighting irregularities, responsiveness to addressing those irregularities has lagged. Around 53 percent of the irregularities raised receive no response from managers. There is currently no procedure to sanction entities who do not respond to a notification from the FCFP. Clearly, the credibility of the FCFP system would be enhanced if response rates were improved. To overcome this weakness, a four-step approach is recommended:

- **2.1 Understand what is driving the lack of responsiveness.** A survey of entities about why they do not respond could be helpful in designing a set of targeted measures to encourage managers to respond. Alternatively, the system could be adjusted to focus on those areas in which responses are made, in order to improve its impact.
- **2.2 Continue to promote greater collaboration among the various entities across the government that make up the system for management and oversight of the payroll.** While both the TCU and the CGU have authority to audit the public payroll, continued efforts to strengthen coordination and

complementarity could be highly beneficial. Such measures could reduce the workload (and perhaps the confusion) of those responding to each system. Regarding databases and systems, greater cooperation between the TCU team and DESIN in the Ministry of Economy and the team working on SA3 (a system developed by the Division of Remuneration and Benefits at Federal Revenue) could bring harmonization benefits to each group that might generate an improvement in responsiveness. Sharing approaches, information, and results across these groups could help improve the performance of all of them. Holding an event that brings together the entities that are part of the payroll management and oversight ecosystem to share methodology, coverage, systems, and results could be the starting point for mutual understanding of how each entity is undertaking, analyzing, and systematizing their work and for considering what responses each entity requires from government managers.

- **2.3 Encourage the FCFP to inform other aspects of the TCU's work.** For example, when financial audits are undertaken of ministries such as health or education, it is not evident that findings from the FCFP are brought to bear in the audit's assessment of payroll. These findings might also help to identify systemic issues or irregularities that could be addressed through structural changes and lead to more lasting results.
- **2.4 Consider whether the wide range of audit trails or the coverage of institutions could be focused more narrowly in order to improve response rates in the system.** As noted above, the identification of irregularities through the FCFP system is almost costless, but the development of responses and resolution of irregularities requires analog responses on the part of managers. If the goal is to improve the impact of the system in terms of resolving issues, reducing the number of audit trails and finding methods to improve responsiveness to those findings could be helpful. Once those issues are resolved, the FCFP could move on to the next set of audit trails.

RECOMMENDATION 3: Define how the FCFP system can inform structural and policy changes that may improve the payroll system. In its current form, the work of the FCFP is focused on resolution of individual irregularities. Although this is important in the TCU's role as auditor, the most important impact of the system is likely to come from the identification of systemic weaknesses that lead to irregularities and from proposing measures that could help to overcome these weaknesses. The information derived from the FCFP findings could inform the units responsible for management of the payroll in the federal administration,

Congress, the judiciary, and the Attorney General's Office, where structural reforms might be most beneficial for enhancing payroll management and strengthening compliance with the rules of the system.

RECOMMENDATION 4: Undertake measures to address risks to the sustainability of the system. The first of these risks relates to the FCFP's team, composed of six people. Forward planning is required to assure that the skills required to maintain and further develop the FCFP remain in place and that it is further institutionalized. A second issue is related to software licensing. A plan "B" should be developed to introduce back-up arrangements should there be a major change in the pricing or licensing of the software that underpins the system. Finally, measures should also be considered for addressing privacy issues that arise out of rulings and interpretations of the Law on the General Protection of Data and the risks that might be posed by a hack of the system.

RECOMMENDATION 5: Use Brazil's presidency of INTOSAI as an opportunity for the TCU to advance the agenda on data-driven digital innovation to improve spending practices and to prevent fraud and corruption. Also, build on FCFP's innovations to spark the exploration of emerging issues. The TCU has been very innovative in applying digital technologies to advance effective auditing and the detection of fraud and corruption. Few other supreme audit institutions have completed payroll audits. The presidency of INTOSAI is an important opportunity for the TCU to share information about how the culture of digital innovation came about, the underlying people and processes that led to its development, the lessons learned from its experience, and its implications for auditing practices outside of Brazil. Given its results and the similar fiscal contexts in other countries, FCFP can be a useful reference for other supreme audit institutions in Latin America and the Caribbean and the world.

The FCFP experience could also spark the exploration of other emerging issues. These include considering the role of the TCU in data audits to assure the quality of data; considering moving from closed-source to open-source technology to improve transparency of the system; moving from reactive analytics to predictive analytics to help establish risk maps and red flags before transactions take place; and drawing on the available data to develop analyses of the gap between public and private salaries, pay scales, and productivity.

**CONTEXT: THE COURT
OF ACCOUNTS AND
ITS ROLE IN AUDITING
MANAGEMENT OF
THE PAYROLL**



The Federal Court of Accounts (Tribunal de Contas da União, or TCU) is the external control institution of the federal government that supports the national congress by overseeing the budget and its financial execution, thereby contributing to the improvement of the public administration for the benefit of society. Article 70 of the 1988 Constitution gives the TCU the legal foundation for its work: “The accounting, financial, budgetary, operational, and patrimonial inspection of the Union and of the direct and indirect administrative entities, regarding legality, legitimacy, economy, application of subsidies, and revenue waivers will be exercised by the national congress, through external control, and through the internal control system of each power.” The TCU, along with the internal control entity, is thus responsible for accounting, financial, budget, performance, and property oversight of public bodies and entities of the country regarding their legality, legitimacy, and best value.

TCU’s organic law (Law number 8.443 of 1992) sets out the competencies of the TCU to oversee accounts across direct and indirect public administration, including public foundations and institutions maintained by the federal government. The law also establishes the authority of the TCU to verify administrative acts, contracts, and facts, as well as carry out examinations regarding the legality and legitimacy of public management acts subject to their jurisdiction with regard to accounting, financial, and budgetary aspects. In recent years, resolutions (TCU 324 of 12/30/2020) and ordinances (Portaria SEFIP No. 2, Feb. 25, 2021) set out both the authority and the possibility of the TCU and of SEFIP to investigate in a continuous manner the personnel expenses of active and inactive civil servants, including pensioners of the union as well as a broad range of social benefits and expenses associated with the civil service. In addition to its investigative authorities, this ordinance also specifies TCU-SEFIP’s role developing a digital system and testing and maintaining the system, as well as training, technical support, and information exchange regarding the system.

The TCU has been one of the most innovative supreme audit institutions in Latin America and the Caribbean, using digital tools to transform how external control is carried out. Among these initiatives, LabContas—TCU’s Information and Control Lab—has been leading cutting-edge initiatives and sharing these experiences across the region. Some of these tools include artificial intelligence (AI) innovations that automated and facilitated control over procurement processes (Bemquerer Costa and Reis, 2020), which were critical especially due to the substantial increase in spending in the context of the response to COVID-19. The TCU has introduced several AI tools nicknamed the “Artificial Ladies against Corruption”—ALICE, ADELE, AGATA, MONICA, and SOFIA—which aid auditing

processes in the public sector (Ramos Neves, Batista da Silva, and Menezes de Carvalho, 2019). Digital Transformation is one of the key pillars of TCU's vision in the context of Brazil's presidency of INTOSAI 2022–2025.

WHY FOCUS ON THE PUBLIC SECTOR WAGE BILL?

Although Brazil is a dynamic emerging market economy, fiscal sustainability has been a central concern of government policy for some time. In recent years, the overall non-financial public sector (NFPS) deficit⁵ has been large, averaging 8 percent of GDP 2015–2019, rising to 13.7 percent of GDP in 2020 as a result of the pandemic response, and then falling to 6.3 percent of GDP in 2021.

The public wage bill is a prominent driver of spending in Brazil. Federal NFPS⁶ wages and pensions averaged 12.7 percent of GDP and 33.5 percent of federal NFPS spending over the 2015–2021 period. On average, federal NFPS spending over the 2015–2021 period amounted to US\$228 billion per annum.⁷

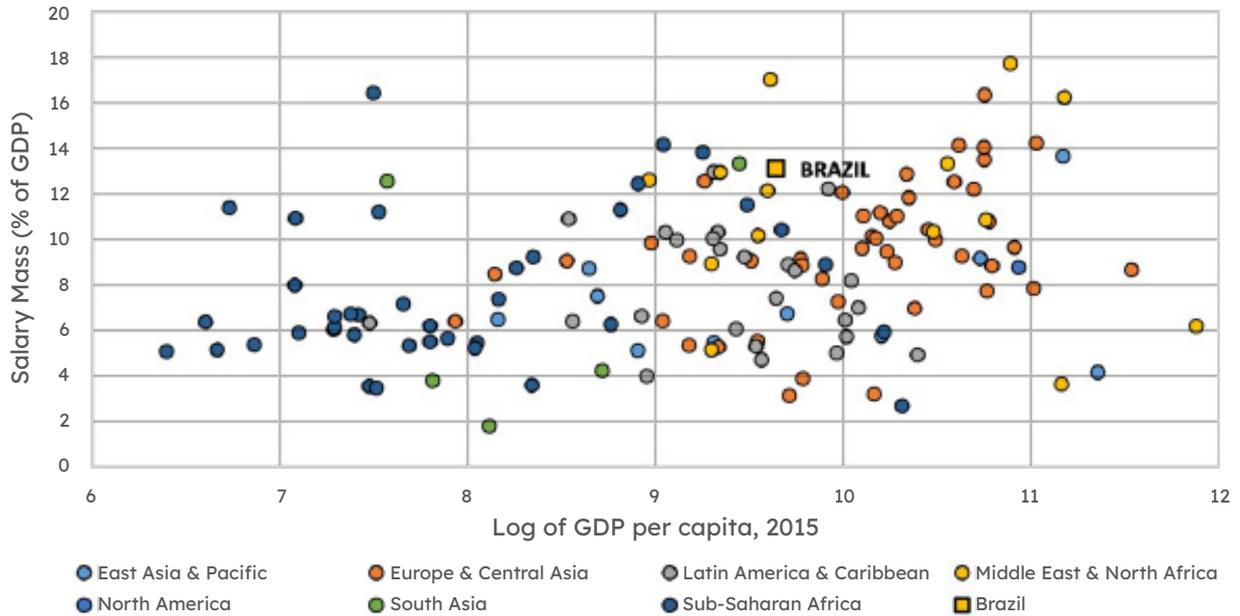
A snapshot in 2017 shows that compared to other countries, the Brazilian federal wage bill was relatively high (see Figure 12 from World Bank, 2017), although the number of civil service workers was proportionately lower than in many other countries (World Bank, 2017; 2019).

⁵ The NFPS deficit includes the federal government, state and municipal governments, and state-owned enterprises (SOEs).

⁶ Federal NFPS spending includes spending on federal wages, federal pensions, and personnel expenditures of SOEs. It is used as the comparator here because the FCFP also covers SOEs.

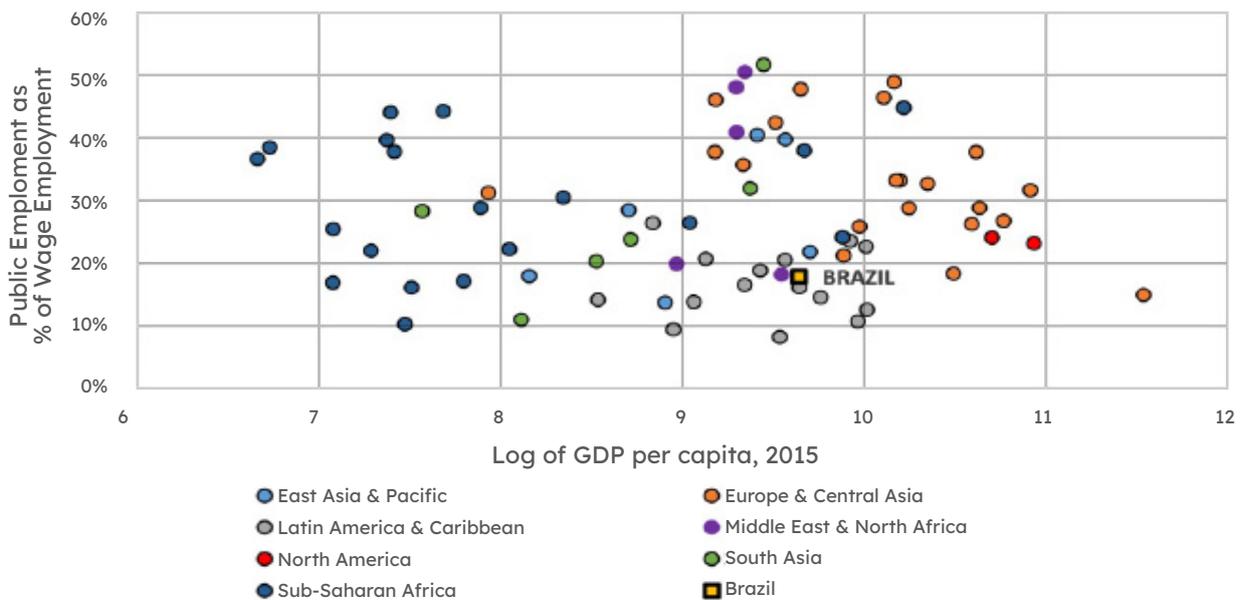
⁷ Because state and local government's participation in the FCFP varies from year to year, we include here only information on the federal level.

FIGURE 1: WAGE BILL AS A PERCENTAGE OF GDP PER COUNTRY



Source: Worldwide Bureaucracy Indicators, World Bank Bureaucracy Lab.

FIGURE 2: PUBLIC EMPLOYMENT AS SHARE OF FORMAL WAGE EMPLOYMENT BY COUNTRY



Source: Worldwide Bureaucracy Indicators, World Bank Bureaucracy Lab.

Note: Various years between 2009 and 2015, depending on the country. Data for Brazil refers to 2014.

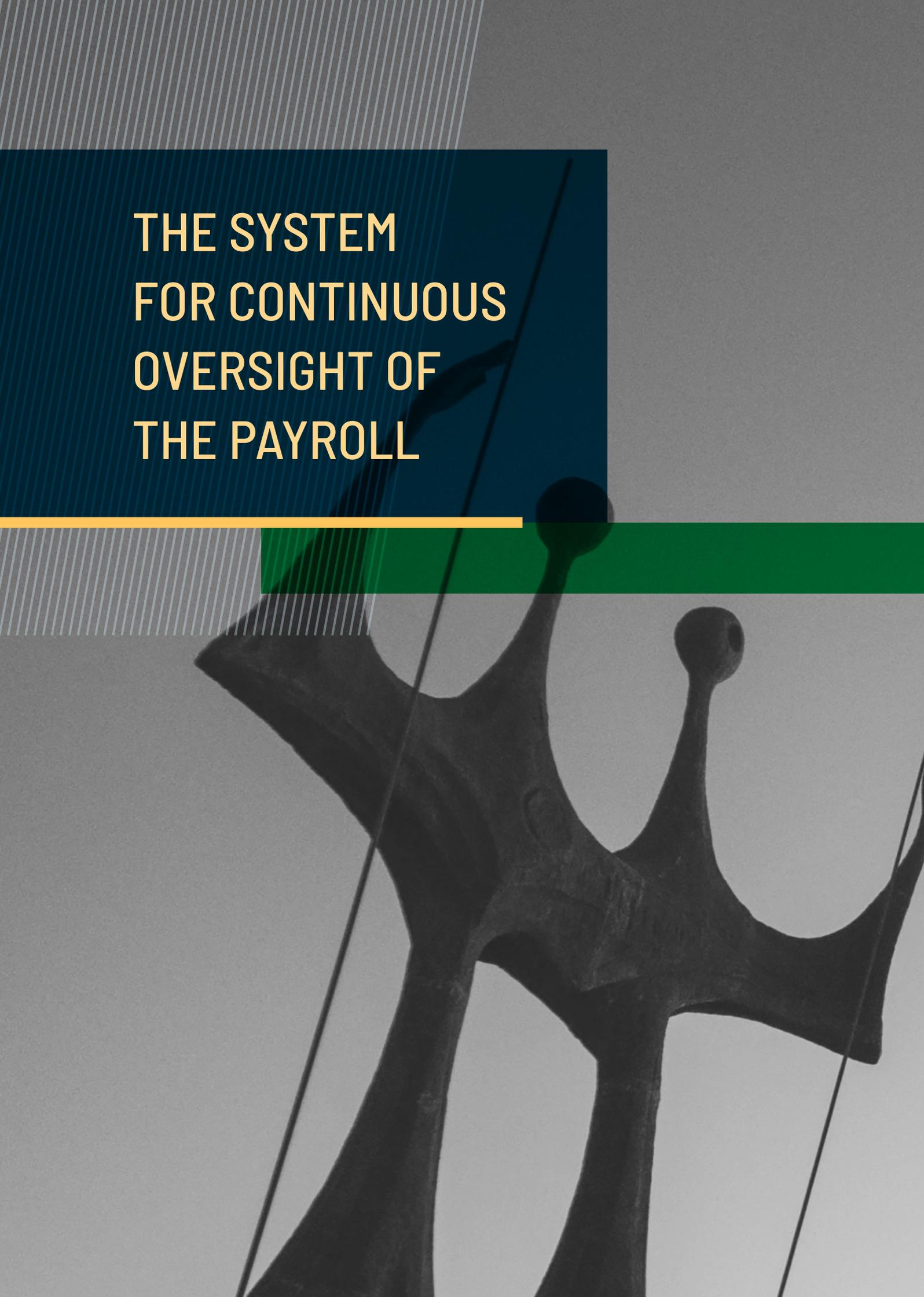
At the federal level, the high cost of public servants drives Brazil's large public sector wage bill, rather than an excessive number of public sector employees.

Although the wage bill is sizeable, the number of civil servants in Brazil and the relative size of the federal government does not appear excessive (World Bank, 2017). The share of public servants employed by the federal government in Brazil is about 12 percent, which is below that of other federal countries (World Bank, 2019), with the remaining 88 percent of public servants working at the state and local levels on personnel-intensive public services such as education, health, and citizen security. Within the federal government, about 81 percent of payroll expenditures go to the executive branch, 13 percent to the judicial branch, 3 percent to the legislative branch, and just under 2 percent to the Attorney General's Office.

The civil service at the federal level is also characterized by a number of long-standing factors that make management of the wage bill very complex (OECD, 2010; World Bank, 2017; IPEA, 2018). There are hundreds of job classifications and career streams across government that reduce flexibility and increase fragmentation. There are also many different schedules for payment that incorporate different components such as payment for results, bonuses, and the like. Given the complexity of the system, the probability for error is high and the challenge for oversight of the payroll is considerable.

Management of civil service workers at the state and municipal levels faces additional challenges. As part of the Fiscal Responsibility Law, states are subject to the cap on personnel expenditure of 60 percent of current liquid revenues (RCL), though salary levels are often linked to federal increases beyond their control. The large number of workers in different sectors (education, health, policing) requires different types of contracts—some permanent and some temporary—that may lead to variations in determination of payment based on base salary, time in service, and other benefits that come with positions. In some states, performance bonuses have become an important part of the pay package, but they have also tended to become permanent as opposed to temporary payments that reward superior results.

The size and complexity of the public sector wage bill will have a critical impact on the fiscal position of the Brazilian government and on economic prospects going forward. It is therefore important that the wage bill is effectively overseen and monitored to assure that resources are used as intended and mistakes and errors are corrected. As the federal government's external auditor, the TCU plays a key role in this oversight, as summarized below.



**THE SYSTEM
FOR CONTINUOUS
OVERSIGHT OF
THE PAYROLL**

TCU has been working since 2015 to establish a system of continuous civil service payroll oversight drawing on innovative digital tools (the *Fiscalização Contínua de Folhas de Pagamento*, or FCFP). The overall objective is to audit and monitor resources that are spent through the public payroll to assure that resources are used in conformity with the laws and regulations governing the remunerations and benefits of civil servants and those on civil servant pensions.⁸ The primary focus and authority of the TCU is over the federal administration, and it is mandatory for federal agencies. However, the TCU has also worked with state and local external control agencies to support more effective monitoring of the payroll at those levels. The coverage and reach of these efforts have varied over time. Through the development and linking of databases, monthly receipt of data, development of panels of management data, and tools for automated analysis of the data, the TCU has been able to identify an increasing number of irregularities across a broader number of government agencies.

Prior to 2015, the TCU carried out payroll audits of 1–10 jurisdictional units or agencies per year. Units would send civil servant data on flash drives to the TCU. Auditors from SEFIP would investigate the data, undertaking manual cross checks of data sources. Examination of spreadsheets presented in different formats, manual cross-checking of data, and interactions with agencies by email limited the scope, scale, and effectiveness of the audits. The payroll audits were perceived as selective and often as “punitive” in trying to point out problems in particular agencies, many of which did not respond to the audits.

The FCFP has emerged as part of a broader effort of the TCU called *Governing-IT* that is intended to draw on advanced data systems and tools to change the nature of the control model. The idea is to develop control techniques that survey and share information with the audited agency so that the agency itself is able to take corrective and eventually preventive actions in key areas of irregularities. Providing agencies with information and accompanying them in the resolution of irregularities may alter the incentives for addressing irregularities, create more constructive relations with audited entities, and increase the scale and effectiveness of the TCU’s work.

⁸ TCU’s Normative Instruction No. 84/2020 establishes that, from 2020, accounts will need to be audited through an integrated financial audit. Accounts should be presented objectively and clearly, with accuracy of statements in the legality, legitimacy, and economy of management actions, including those related to the payroll.

In 2021, the FCFP was able to oversee the payroll of 594 federal entities per year and provide information on 39 different types of irregularities, generating savings of R\$405 million or 0.1 percent of the total audited payroll.

The FCFP system has continuously evolved and advanced. As noted, in 2015 some data and clarifications were received automatically, but others were received in the form of spreadsheets. In 2017, systems were introduced to receive data through automated databases and to manage cases of irregularity. In 2018, a shift was made to monthly receipt of data and the payroll, making the process continuous as opposed to the examination of a snapshot at one point in the year. In 2019, systems were developed to create management information panels, allowing for easier access to information and markers of progress or of issues. In 2020, tools were deployed to use automated analysis of the clarifications provided by agencies; in 2021, communication was intensified to prompt corrective actions by the agencies experiencing consistent irregularities. The FCFP is a living system in that it is continuously undergoing improvement and revisions in order to improve its effectiveness.

SEFIP—a small TCU department called the Secretariat of External Control for Personnel Actions and Social Benefits— plays the key role in developing and coordinating the FCFP. SEFIP is an agile unit of six people including auditors with experience in data science, auditors specialized in payroll and inspection and capable of building hypotheses of evidence based on the payroll legislation for public servants and pensioners, and one full-stack developer that provides the needed computer coding. SEFIP works closely with SETIC (TCU's Department of IT Infrastructure) and STI (TCU's Department of IT Solutions) in the collection, cleaning, and laying out of the data to be used in a system called LabContas, which serves as a data warehouse for the entire TCU.

THE FOUR STEPS OF FCFP

The basic process of the FCFP has four principal steps: (i) obtaining data, (ii) the application of audit trail programs and the analysis of the data suggesting irregularities, (iii) seeking clarifications on irregularities from the relevant jurisdictional units, and (iv) analysis of the clarifications provided by these units and preparation of the audit report.

FIGURE 3: LIFE CYCLE OF THE FCFP



Source: TCU-SEFIP

DATA AND COVERAGE OF THE SYSTEM

Data used in the continuous monitoring of the payroll is drawn from a number of datasets.

- **SIAPE:** This is data from the Integrated System for Personnel Administration of the federal government. SIAPE is the system used by most of the executive branch of the federal administration and it also includes some state autarkies and state-owned enterprises (SOEs). Data from SIAPE are directly downloaded by the TCU, facilitating the access and use of data.
- **EXTRA-SIAPE:** This is data provided originally once a year, but now on a monthly basis, by jurisdictional units that are not covered by SIAPE. It covers workers from the judicial and legislative branches of government, the Attorney General's Office, the TCU itself, the central bank, the military forces, and critical SOEs.⁹ Extra-SIAPE data are uploaded individually by each entity using the e-Pessoal system (see below); this requires monthly generation and upload of payroll data by these entities, a task that requires the time and effort of each agency.
- **STATE AND LOCAL LEVEL PAYROLL DATASETS OBTAINED AFTER AGREEMENTS WITH STATE AND MUNICIPAL COURTS OF ACCOUNTS (TCEs AND TCMs).** Since 2016, the TCU has had annual agreements with a range of state- and municipal-level external control institutions to share information on the public sector payroll. Participating state and municipal entities have varied each year, making year-on-year comparisons difficult.

⁹ These SOEs include Bank of the Northeast, BNDES, Caixa Econômica Federal, the post office, Eletrobras, and Petrobras.

- **RAIS:** This data is drawn from the annual social information database. It includes information provided by Councils of Professional Control (Conselhos de Fiscalização Profissional) that do not use SIAPE or Extra-SIAPE. The RAIS data are dated, often coming with a two-year lag.

The FCFP has allowed the TCU to audit the personnel payments of a large number of entities and civil servants/pensioners—far beyond what it was able to cover previously. Based on the information in the accompanying reports, in the early years, the FCFP coverage grew rapidly to 300 federal agencies. Today, around 600 entities are covered. SIAPE has consistently been the source of data for about 200 entities, Extra-SIAPE furnishes data for about 84–88 entities, and federal RAIS data is provided for about 300 entities in recent years.

TABLE 1: COVERAGE OF THE FCFP, 2015-2021

FCFP Cycle	1	2	3	4	5	6	7
Time frame	Mar-15	Mar-16	Mar-17	Mar-Sep 2018	2019	2020	2021
Federal jurisdictional units (JUs)	76	300	652	798	570	608	594
JU coverage of database							
SIAPE		219	569	213	202	221	176
EXTRA-SIAPE	76	81	83	84	84	86	87
RAIS				501	284	301	331
Total federal civil servants covered		2,343,772	4,399,900	3,988,853	3,167,388	2,821,507	2,761,506
SIAPE		1,295,166	3,008,036	2,169,391	1,668,592	1,423,284	1,419,197
EXTRA-SIAPE	12,331	1,048,606	1,391,864	1,819,462	1,423,806	1,330,433	1,281,242
RAIS Federal					74,990	67,790	61,067
Memo							
Acórdão TCEs (no.)	2	17	3	20	8	15	21
Acórdão TCEs (no. civil servants)	431,404	3,637,039	363,291	5,326,351	1,718,859	5,789,185	6,411,771
Total civil servants covered (as indicated in reports)	443,735	5,980,811	4,763,191	9,315,204	4,886,247	8,610,692	9,173,277

Source: Compiled by authors based on TCU, accompanying reports, and TCU data.

The number of federal civil servants and pensioners covered has ranged from 2.3 million in the early years to a high of 4.4 million in the third year. The most recent cycles reflect coverage of 2.8 million civil servants and pensioners. Some of the accompanying reports provide data on state and local coverage but the number of agreements varies significantly across cycles. In 2021, the FCFP had agreements with 21 state and control bodies that covered an additional 6.4 million civil servants at the state and local level.

The number of entities and civil servants/pensioners covered by the system may vary for several reasons. With respect to jurisdictional units, there is the challenge of adequate and timely provision of the required data in the appropriate format. This has been a major consideration in the development of the system in order to simplify and

codify the process, and there has been an evolution over the years. Nevertheless, and despite being mandatory for federal government agencies, some units have resisted providing data as needed. Some of the fluctuation in numbers may be due to both shifting organizational structures as well as the expected demographics of individuals joining and departing from the civil service or pensioner payrolls. State and local control entities (TCEs and TCMs) participate on a voluntary basis and participation varies each year, making consistent coverage a challenge.

Databases are kept within the Information and Control Lab (LabContas).

This is a TCU corporate platform composed of databases, catalogs of information, tools, and solutions for processing and analyzing data to perform external control activities. In practice, it consists of a virtual machine that gives access to the databases internalized in the TCU's corporate structured query language (SQL) server and provides tools for auditors to carry out analyses. In the case of the FCFP, the analysis processes are developed based on the SQL language itself through the so-called procedures, which are stored in the databases themselves. Whenever a process needs to be created or improved, it is done by creating or tweaking these procedures. LabContas is developed and maintained by the TCU IT team.

The internalization, updating, and inclusion of new databases is done manually by the inspection team. The process is facilitated by a prior standardization provided for in the work plan that is signed between the TCU and the partner agencies and courts and defines the responsibility of the partners to send data in a specific format. The order and types of the fields are defined (for example, whether they are mandatory and what format to use for each data item). There are 15 types of fields defined for files referring to active, inactive, and pension providers, plus 14 fields for pensioners and 8 fields for dependents. Finally, 10 fields are defined for the payroll rubric files.

The licensing policy of the databases is guided by sharing agreements. There are currently three levels of access: public databases, access restricted to control bodies, and access restricted to TCU exclusively. The transmission of databases is generally done in compressed text format, protected only by the browser's Secure Sockets Layer (SSL) encryption, with the exception of some cases such as the Internal Revenue Service (IRS) databases that are encrypted using asymmetric encryption methods (public key/private key).

THE APPLICATION OF AUDIT TRAIL PROGRAMS (TRILHAS/TIPOLOGIAS)

Once the databases are ready, automated programs that cross-check the databases are applied based on 39 audit trails. Of these, 27 tracks are specific

to the federal context and another 12 are related to the analysis of the databases provided by the state and local entities, as well as the federal databases. The audit trails are developed and tested by the inspection team, but the improvement process is carried out using the information from clarifications sent by jurisdictional units. When any type of error is identified, the processes are updated and the evidence is archived.

Through the cross-checking of databases using the audit trails, the system highlights so-called irregularities (*indicios* is the term used in the report).

Irregularities may arise for a number of reasons. There can be inconsistencies in the databases regarding information that is supposed to be consistent. There can be payments made that do not comply with the relevant laws and are therefore illegal. There may also be payments made that are legal but are either duplicates (for example, two individuals who are married to each other and work for the civil service may receive a benefit for the same child twice) or of an incorrect amount (for example, exceeding the salary cap for a specific position). Some irregularities may be based on a simple oversight, whereas some may derive from intentional behavior on the part of the civil servant. The next stage of clarification of the irregularities (discussed below) is instrumental in sorting through the nature of the irregularity.

Each of these audit trails in the FCFP is documented, specifying the legal criteria on which it is based, the analysis procedure, and the technical procedure for carrying out the analysis. For example, for the Payments to a Deceased Pensioner audit trail, the documentation cites Law 8.112/90, Art. 222, I as the legal basis for identifying an irregularity. The source of data is specified as SIAPE, Extra-SIAPE, and the National System of Civil Registry (SIRC). The documentation goes on to specify the methodology for analysis as well as the coding in the system. Such documentation exists for each audit trail. The number of audit trails has grown and evolved over the development of the system. The first cycle (2015) used three audit trails. In the most recent cycles, 39 audit trails were used, grouped into several areas (see Table 2).

Table 2 shows that from 2015 through 2021, a total of 415,125 irregularities were identified as the number of audit trails expanded. In the fourth year (2018), data collection shifted to collection on a monthly basis and some data began to be received from state and municipal sources. This change is reflected in the large increase in identified irregularities in 2018. The number of irregularities identified per year varies because as irregularities are identified, they are also corrected, and monitoring of that particular type of irregularity is improved. Also, corrections and adjustments are made to the audit trails on an ongoing basis.

The largest share (45.8 percent) of irregularities over the years falls under the category of “illicit or incompatible accumulations of positions, jobs, functions, and or pensions,” meaning that an individual has or is receiving more of these than is allowed. The next largest category (32.1 percent) is “undue payments,” in which individuals received payments that they were not entitled to, “inconsistencies in personnel acts or in registration” (7.6 percent), and “violations of the salary ceiling” (4.5 percent).

TABLE 2: EVOLUTION OF THE QUANTITY OF IRREGULARITIES, 2015-2021

	2015	2016	2017	2018	2019	2020	2021	Total	Total (%)
Illicit or incompatible accumulations (positions, jobs, functions, and/or pensions)	342	38,223	9,975	84,191	9,961	33,894	13,342	189,928	45.8
Undue payments	956	450	22,338	55,814	19,300	6,049	28,190	133,097	32.1
Personnel acts to be included in e-Pessoal or registration failures	n/a	n/a	35	21	4,318	2,600	24,778	31,752	7.6
Violations of the salary ceiling	n/a	1,030	563	605	3,732	1,648	10,961	18,539	4.5
Payments to deceased persons	n/a	n/a	1,561	2,522	2,148	2,509	2,343	11,083	2.7
Pensions paid to those not entitled	n/a	n/a	1,168	4,955	1,863	1,724	335	10,045	2.4
Monitoring of agreements	n/a	n/a	n/a	n/a	n/a	n/a	8,830	8,830	2.1
Duplicate payments	62	200	144	4,250	869	897	556	6,978	1.7
Occupations of public office or employment by an impeded person	n/a	n/a	n/a	612	248	2,697	1,316	4,873	1.2
TOTAL	1,360	39,903	35,784	152,970	42,439	52,018	90,651	415,125	100

Source: TCU

As part of its process of continual evolution, the FCFP team regularly evaluates the audit trails and whether they should be maintained in the FCFP system.

While primarily relying on the judgment of its own and other experts, over the years the team has also taken into consideration the materiality, frequency, and risk of the irregularities when determining whether an indicator should be maintained. In some cases, data inconsistency can lead to significant false positives and an audit trail may be discontinued. In other cases, such as with the indicator on noncompliance with legislated working hours, the legislation may not be fully clear, and an indicator may be adjusted or dropped. Starting in 2021, annual workshops are held with public servants from federal institutions to receive feedback from the previous year and discuss updates to the audit trails used and the types of irregularities examined. Participants include specialists in audit of the payroll and other auditors from the TCU, as well as partner organizations who receive notice of the irregularities and are expected to provide clarifications. Participants discuss the criteria for maintaining audit trails in the

FCFP system, with the top three criteria agreed to be materiality, frequency of confirmed cases, and legality and alignment with legislative changes.¹⁰ The FCFP now uses 39 audit trails grouped into eight themes.

SEEKING CLARIFICATION ON IRREGULARITIES FROM THE RELEVANT JURISDICTIONAL UNITS

Once the data is obtained and analyzed, the next phase is to contact jurisdictional units to clarify irregularities. TCU reports provide information on the treatment of the identified irregularities that receive responses by categories, including: (i) irregularity accepted and regularized, (ii) irregularity accepted and measures to correct under way, (iii) irregularity accepted and measures to correct not yet under way, (iv) irregularity not accepted (false positive), and (v) irregularity addressed through other external processes.

TABLE 3: CLASSIFICATION OF IRREGULARITIES, 2015-2021

	2015	2016	2017	2018	2019	2020	2021
No. of irregularities found	1,360	39,903	35,784	152,970	42,439	52,018	90,651
No. of irregularities with responses	1,711	20,208	6,883	38,642	23,899	17,095	38,401
percent responded to	125.8	50.6	19.2	25.3	56.3	32.9	42.4
Nature of response (percent)							
1. Irregularity accepted and regularized	1.0	6.1	15.7	18.7	14.5	19.1	16.8
2. Irregularity accepted and measures under way	12.1	34.4	22.0	22.4	22.6	16.6	15.5
3. Irregularity accepted and measures not yet under way	3.6	25.3	2.4	2.3	4.3	1.1	3.0
4. Irregularity not accepted (false positive)	17.5	22.8	45.8	43.4	38.4	44.6	38.8
5. Irregularity addressed through other forms/areas	65.8	11.5	14.2	13.2	20.1	18.5	25.8
Total	100	100	100	100	100	100	100
1+2+3 – Irregularities accepted	16.7	65.7	40.0	43.4	41.5	36.9	35.4
4+5 – Irregularities not accepted or addressed elsewhere	83.3	34.3	60.0	56.6	58.5	63.1	64.6

Source: TCU

A few key factors influenced the effectiveness of the FCFP work as the system was adjusted and expanded. With the switch to demand for monthly information in 2018, many jurisdictional units found it difficult to deliver data within the required time frames. Also, given inconsistencies in the databases between RAIS, Extra-SIAPE, and the TCE/TCM information, the number of false positives became

¹⁰ For example, in 2022 it was agreed that 20 of the audit trails would be continued and three would be discontinued (public servant over 75 years of age, “quintos” incorporated illegally into payments or earnings, undue accumulation of performance bonuses) (TCU, 2021b, paragraph 125).

large. Nevertheless, response rates on clarifications of irregularities have been and remain a fundamental issue for full effectiveness of the FCFP.

There are a number of reasons for the low rate of response to requests for clarifications. In 2017, the e-Pessoal system was made available to provide clarifications by noting observations or justifications, highlighting legal foundations in support of the payments or benefits, and annexing supporting documents.¹¹ However, it took some time for the relevant staff of jurisdictional units to register in the portal, receive profiles, and learn how to operate it effectively. Given the expansion in coverage of the system, some entities had a high level of cases and difficulty in getting information and responses from the beneficiaries as needed. Many units indicated that they did not have sufficient staff to analyze the high number of irregularities, an issue complicated by the pandemic. There were also circumstances when beneficiaries went to judicial powers to try to defend benefits that were not consistent with legislation.

The FCFP team provides information, manuals, and hands-on support to assist in the resolution of irregularities. The team also makes numerous presentations and holds workshops to help advance understanding of the system. Management information panels to assist partners have been incorporated into the e-Pessoal system. In the sixth cycle—based on an assessment of the materiality, cost, and risk of the outstanding irregularities—the top 30 jurisdictional units with delays in responsiveness were identified and action plans developed and submitted to the TCU for resolution.¹² The accompanying report of the seventh cycle examined continued delays in meeting the goals of the action plans, as well as some 97 entities that provided no clarifications at all in 2021.¹³

In addition to keeping track of the irregularities by audit trail, the introduction of the Módulo Índicios from the e-Pessoal system served to create a system for monitoring progress in resolving cases. This system highlights the large number of cases identified and thus the utility of drawing on automated systems to identify possible irregularities. However, it also highlights the difficulty of

¹¹ The registration of a clarification in the e-Pessoal system by partners involves four steps: (i) classification of the position on the irregularity (choice among categories 1–5 on whether the irregularity is accepted or not), (ii) insert justifications, (iii) insert grounds and supporting documents (grounds are through selection of pre-determined choices, documents must be attached), and (iv) send clarification to control body. These can be saved and edited at any time during the insertion process. Once sent to the control body, the clarification passes to internal analysis and is accessible to the inspection team. The FCFP team then proceeds with the necessary referrals.

¹² TCU (2019); paragraphs 111–125 provide specific details.

¹³ TCU (2021b, paragraph 125).

getting responses on clarifications and advancing resolution of irregularities when partner agencies are uncooperative. The experience to date suggests that there may be a trade-off between how rapidly the automated system expands and the ability of agencies to address irregularities.

ANALYSIS OF CLARIFICATIONS PROVIDED AND PREPARATION OF AUDIT REPORT AND VOTE

Once a year, after analysis of the clarifications submitted and the preparation of the accompanying report is completed, the TCU meets in plenary to present and review the report, agree on the findings and follow-up actions, and vote so that the work of the audit cycle is documented. Each report lists the agencies and civil servants covered, highlights the methodology and the results of the exercise, and typically introduces two to four issues for deeper examination as part of the cycle. Although the oversight of the payroll is a continuous process, these reports help to highlight issues as well as opportunities for the system. They also provide the basis for further actions and agreements among government agencies.¹⁴

The TCU's development of the FCFP highlights the degree to which technology can be used to share and cross-check information, allowing a deeper understanding of where issues in the payroll may arise. The system has highlighted hundreds of thousands of irregularities. The assumption is that by providing this information and highlighting irregularities, agencies will follow up in the correction of irregularities in order to comply with legislation and to save resources. While the TCU has full authority to investigate the use of federal resources and to share information in partnership with state- and local-level external control institutions, it has fewer tools to compel responses to the findings of the system. The key mechanism that it highlights is the potential savings to the government if measures are implemented, as described below.

¹⁴ There may be work carried out by the FCFP that does not get discussed in the TCU plenary nor shared with departments of the TCU.

FCFP'S ESTIMATED FINANCIAL BENEFITS

The paramount objective of the FCFP is to help assure that resources going to the public payroll are being spent in compliance with existing rules and legislation. Determining the actual financial benefit of the system is complex.

As noted in the introduction, the public payroll is among the largest portions of Brazil's budget and the size and complexity of Brazil's public sector, as well as its evolution over time, make the oversight of payroll spending an immense challenge. The FCFP has been innovative in using data and technology to help examine irregularities in the payroll at scale. As the system has developed, so have approaches to estimating the potential and effective financial benefits and/or savings to the public purse.

The methodology for assessing the financial benefit of the FCFP for the federal public administration has evolved over the years. In the early years (2015–2017), two types of financial benefit were identified: the “potential” financial benefit, which identified the financial gain if all of the irregularities identified were to be resolved, and the “effective” financial benefit from those irregularities that were accepted by managers and at some stage of being corrected or resolved. In these early years, calculations of the effective financial benefit did not yet take into account the analysis of the TCU-SEFIP team as to whether irregularities were actually resolved or not. This was corrected in the 2018 cycle.

From 2018 onward, the estimates of effective financial benefit focused on irregularities that had been identified, received responses, and been analyzed by the TCU-SEFIP team, taking into account the track record of actual resolution in past years. Over time, the TCU-SEFIP team has tried to improve the accuracy of its estimates, while also highlighting the potential to save substantial resources should all of the identified irregularities be pursued and resolved.

Table 4 shows the effective financial benefit, defined as the financial savings of irregularities that have been accepted by the public administration and are either resolved or are in the process of being resolved. The effective financial benefit has fluctuated over the years, from R\$21.6 million in its first year to R\$654.3 million in 2018 and R\$404.9 million in 2021. These fluctuations are possible either because the system is examining new types of irregularities or because individuals are seeking other avenues to benefit.

Although this amount is a small share of the total audited payroll and of the total payroll itself, the absolute values are large. Between 2015 and 2021, the total effective financial benefit is estimated to be over R\$2 billion (or US\$515 million using the annual average exchange rate). Once the system has been established,

the costs of running it are very low—salaries for a team of six staff and the cost of licensing the necessary software—so the system has provided excellent value for money to date and has the potential to do more.

TABLE 4: ANNUAL EFFECTIVE FINANCIAL BENEFIT OF THE FCFP, 2015-2021

	2015	2016	2017	2018	2019	2020	2021
Annual “effective financial benefit” (R\$ mn)	21.6	299.5	138.6	654.3	208.9	349	404.9
Annual audited federal NFPS wages and pensions (R\$ bn)	260	260	288.8	334.6	432.5	356.4	367.9
Total federal NFPS wages and pensions (R\$ bn)	689.7	776.4	862.5	909.6	944.8	1006.9	1070.6
Effective financial benefit/audited federal NFPS wages and pensions (%)	0.01	0.12	0.05	0.20	0.05	0.10	0.11
Effective financial benefit/total federal NFPS wages and pensions (%)	0.003	0.039	0.016	0.072	0.022	0.035	0.038

Source: TCU and IMF (2021) for total federal NFPS wages.



INTERNATIONAL EXPERIENCE

Exploration of other international experiences in the audit of public payroll suggests that the approach used by the TCU is a singular one. Most governments address audit of payroll as part of the presentation of accounts of specific government bodies rather than as a separate exercise. Here we discuss the systems of the United Kingdom and the United States.

UNITED KINGDOM¹⁵

In the United Kingdom, the National Audit Office (NAO) fulfills a similar role in relation to the central government as does the TCU in Brazil. The NAO is an independent parliamentary body that is responsible for auditing central government departments, government agencies, and non-departmental bodies. There are around 400 central government departments and government-owned organizations that the NAO audits. The NAO does not audit local government bodies and it does not audit the governments in Scotland, Wales, and Northern Ireland.

Audit work on the payroll is a core part of annual financial review that the NAO carries out for its audited bodies, which results in an audit report on the financial statements of each organization. Most government departments and government-owned organizations operate their own payroll system and outsource the work to third-party providers in the private sector. However, there are two shared service centers that are used by a number of central government departments and government-owned entities. While these centers operate different systems and processes, users draw on the same central accounting and payroll services. In general, there is no common public sector or central government payroll system.

The NAO has adopted a substantive approach to testing payroll data rather than using data analytics. The substantive approach involves developing a total salary prediction based on staff numbers and average actual salaries. The data used in the calculation is supported by testing a sample of actual payroll payments made. The prediction arrived at is compared with the payroll figure recorded in the financial statements and, in the event of a significant material difference, an investigation is undertaken.

¹⁵ This information is based on a conversation with Peter Smithson, Director of the IT Audit at the National Audit Office, followed by a short note. We thank him for sharing his insights and knowledge about the NAO's approach to audit of the public payroll.

While the NAO has done some trials of the use of data analytics on payroll data,¹⁶ they have not sought to adopt data analytics as a regular tool given the challenges that would need to be overcome. One challenge would be obtaining data from multiple payroll service providers who are separate from the entities audited by the NAO and therefore require separate legal safeguards. A second challenge relates to the General Data Protection Regulation (GDPR) to which the UK is subject and which requires systems to safeguard the security of the personal information to be collected. Finally, the NAO experiences similar difficulty as the TCU regarding the quality of the data needed to support a data analytics approach. The quality of the data is not good enough to allow the NAO to identify and follow up on a whole range of potential errors.

UNITED STATES

The U.S. Government Accountability Office (GAO) is an independent non-partisan agency that works for the U.S. Congress. The GAO provides Congress, the heads of executive agencies, and the public with timely, fact-based non-partisan information that can be used to improve government operations and save taxpayer resources. The GAO's work is done at the request of congressional committees or subcommittees or is statutorily required.

In the United States, the GAO has not pursued a data analytics approach to oversight of the federal payroll due to issues with data reliability. The Office of Personnel Management (OPM) maintains consolidated personnel and payroll data for government-wide analytic and other functions. There are five or so contracted service centers that process the federal payroll and they each collate, standardize, and report biweekly data to the OPM. The service centers do provide various error and exceptions reporting for member agencies. However, this reporting varies by service center and can depend on whether a given agency has requested the data. More generally, efforts to assess payroll integrity reside within the agency, which limits the possibility of carrying out cross-cutting analysis of irregularities.¹⁷

¹⁶ The NAO has in some cases drawn on data analytics when the substantive approach does not provide a good prediction of pay costs. It has also undertaken small tests of analytics in such areas as identifying “ghost” workers, invalid social security numbers, and payment transaction outliers.

¹⁷ Special thanks to Rebecca Shea (GAO), who provided us with useful information on the existing framework in the United States.

GAO (2016) noted that the enterprise and human resource payroll data collected by agencies are not fully supporting the OPM in its strategic and open data goals. It noted that the OPM has not taken the steps to make the data widely available for use by other government entities. This would help in the development of a comprehensive source of pay- and leave-related data across the United States federal government. The report also notes weaknesses in the payroll data reliability. Several recommendations made in the 2016 report, such as improving the availability of the data, strengthening OPM internal controls for data quality, and integration of the databases, are yet to be implemented as of November 2022.

The exploration of digital tools used by other governments for auditing payments—payroll or otherwise—is an area for continued learning. Brazil's presidency of INTOSAI in the coming years and Brazil's experience with the FCFP could enable the TCU to play a leading role in the sharing of knowledge and systems for drawing on digital tools in public payroll oversight. With good data, some degree of centralized oversight, interoperability of digital systems, and a capable team, other countries may also find that they can apply aspects of the innovations developed by the FCFP to their own systems.



OPPORTUNITIES AND CHALLENGES

The development of the FCFP reflects a culture of innovation at the TCU that has encouraged problem solving through unconventional approaches, leading to entirely new opportunities. Prior to 2015, audits of the civil service payroll and management of benefits occurred in a few agencies at a time. While this approach was in line with the traditions of effective auditing, it lacked the scale required to systematically highlight issues and produce any significant financial benefits. By allowing a small team to work over several years to develop an automated digital system for monitoring the payroll and benefits, the TCU created a means to control the civil service payroll at scale and in a manner that complements “deep dive” audits of a few institutions using a broad horizontal approach based on sharing information and accompanying partner entities in seeking resolution of irregularities. Such an approach sheds light on systemic issues affecting implementation of payrolls, as opposed to focusing on single institutions. The development and effective use of the FCFP implies a significant culture change.

Since 2015 the technical development of the system has occurred through a process of “learning by doing” and constant efforts to improve the system by a small and highly dedicated team. The FCFP has moved from a process that was a one-month snapshot of information for the entire year in 2015 to a continuous process with monthly information since 2017. In its early days, the system required management of databases and information through individual emails. It has now been transformed into an electronic and automated online system for identifying and managing payroll irregularities that partners can access at any time. The FCFP has significantly reduced the transaction cost of highlighting irregularities in the payroll system, allowing coverage of almost 600 government or quasi-governmental institutions.

The continuous development of the technology, presentation of information in the system, and automated access to the e-Pessoal management information system provides significantly greater opportunities for jurisdictional units to be proactive and auto-correct issues as they arise. This implies less bureaucracy for those entities willing to engage with the FCFP system and more rapid identification and resolution of irregularities in the system. It can also help to identify areas that require clarification in cases where irregularities may be identified but resolution is not straightforward.

There is also an opportunity for better coordination between the TCU team and other entities working on payroll management. The work on the FCFP by the TCU is part of a broader government community of government entities that help to oversee and guide the public payroll. These entities include the comptroller or

internal auditor of the government (Controladoria Geral da União – CGU) through the Federal Secretariat of Controls (SFC); the Secretariat of Personnel Management of the Ministry of Economy (Secretaria de Gestão e Desempenho de Pessoal – SGP), including its Department of Digital Solutions and Management Information (Departamento de Soluções Digitais e Informações Gerenciais – DESIN/SGP/ME); the Department of Personnel Management of the Corporate Management Secretariat of the Ministry of Economy (Diretoria de Gestão Corporativa – DGP/SGC/ME); and the Division for Remuneration and Benefits in the Special Secretariat at Federal Revenue (Divisão de Remuneração e Benefícios da Coordenação de Gestão de Pessoas da Secretaria Especial da Receita Federal – DIREM/COGEP/SUCOR/RFB).

There is some overlap in the functions of the TCU and the CGU with respect to payroll audit.¹⁸ While the TCU has authority to audit all branches of government (including Congress, the judiciary, and the Attorney General’s Office) and the CGU is responsible for internal audit of the executive branch, both entities share the same authority to audit the federal administration payroll with respect to its legality, legitimacy, and economy. The CGU has also developed databases for the state and municipal levels. Like the TCU, the CGU deploys a system of audit built on the application of audit trails and cross-checking of information in the SIAPE database. These audits are used as an input into the analyses of the consistency of the payroll and as inputs into Audits of Evaluation and Management Monitoring.

Efforts to clarify the division of labor in the oversight of the payroll have been under way. For example, a Normative Decision¹⁹ by the TCU issued in March 2022 sets out the complementary norms for the presentation of accounts, noting that the internal audit bodies should certify accounts related to extraordinary presentation of accounts. A follow-up document (Portaria – TCU – 49, April 7, 2022) highlights the presentation of accounts by internet and also defines which institution—either the TCU or the CGU—should certify the accounts of each agency. These efforts to coordinate are important in order to reduce duplication of activity, systematize the information being requested by control bodies, and to make it easier for government agencies to respond to the findings of the audits.

¹⁸ The background paper prepared by Fátima Cartaxo (2022) presents the results and analysis of interviews with representatives of the above-mentioned bodies. The paragraphs that follow rely on the results presented in that paper.

¹⁹ See TCU, Decisão Normativa No. 198, March 23, 2022, Annex 1.

The DESIN/SGP/ME within SGP in the Ministry of Economy manages the SIAPE database and makes contributions to the development of digital tools that are used in the management of the payroll system. These include automated rules that are embedded into the system so that the appropriate payments shall be made. Interactions between the TCU-SEFIP team and those working on similar areas in SGP could be enhanced. For example, it would be valuable to share knowledge about how the various digital systems work and to further progress in the alignment of data and tools. Moreover, “informed values” (*valores informados*) are not programmed by the central bodies in charge of payroll, but rather by the sectoral entities, because of their specific nature (such as rewards for achieving results). As such, their control is not covered by the CGU or through SGP’s tools.

TCU-SEFIP’s team has been coordinating with the Ministry of Economy’s SGP. Discussions center on trying to harmonize the audit trails and systems for cross-checking so that queries to governmental agencies can be streamlined. However, the results of the control institutions—both TCU and CGU—have not yet been brought into consideration in the designs of the routines, registrations, and special work on the personnel action system called SIPEC. In the future, the system could take advantage of what is learned through the categorization of irregularities to adjust structural or policy aspects of the public payroll and use the opportunity to use data and evidence to help inform civil service payroll policy.

Coordination efforts could be expanded to include the specific entity at the Federal Revenue. The work of these entities concentrates on the calculation and oversight of “informed values” related to efficiency bonuses that are integrated into the payroll at the federal level. They have developed their own system, called SA3, with many functionalities that serve as another means of extracting financial and registration data and developing mechanisms for cross-checking payroll data, although it does not carry out an overall audit of the payroll since it is not their responsibility.

In sum, there may be gains to all parts of the system from greater collaboration and understanding of the actions and systems being deployed by other parts. Moving from processes that seem relatively siloed to better coordination among these entities could create an even stronger force for improving databases and approaches, as well as reducing the duplication of work. Greater coordination might also reduce the burden placed upon government entities to provide responses to the different parts of the system and therefore lead to greater responsiveness and impact of all of the systems.

The FCFP has also created the possibility for greater interaction among control entities and partner entities through online communities, workshops, and conferences. These efforts not only serve to explain the FCFP system to other parts of government, but also provide an example of how data collection, cross-checking, and application of digital tools can be used to enhance administrative systems across government and to explore new ways of drawing on digital government to help achieve key objectives. As noted above, interviews with other stakeholders in the federal administration and subnational control bodies concerned with payroll management suggest that greater sharing of information about the FCFP could help to reduce duplication of work, harmonize databases, improve overall systems of payroll management, and strengthen the overall community working on payroll management and oversight.

In addition to working with oversight entities and partner governments, there may also be an opportunity to open some aspects of the FCFP system to civil society in order to develop mechanisms for citizen oversight. Such engagement with civil society could help in improving awareness of the TCU's work in overseeing the public payroll while strengthening demand for greater responsiveness on the part of partner governments in the resolution of key issues.

Despite the impressive accomplishments of the system over the past seven years, there are some challenges to be addressed for the FCFP system to reach its full potential.²⁰ These include the following:

■ **COVERAGE AND CONSISTENCY OF DATABASES**

Digital systems that work through a process of cross-checking databases rely heavily on the quality and consistency of the underlying data. As noted, the FCFP relies on data provided to the TCU from SIAPE, Extra-SIAPE, and RAIS and from state and local entities. SIAPE data is downloaded directly by the TCU, but Extra-SIAPE, RAIS, and state and local data require the efforts of external organizations to upload data on a regular basis, which means that compliance varies considerably. Some entities are reluctant to share data, citing security or privacy issues. Some entities simply choose not to do so. For example, in 2020, 60 federal entities stopped providing data altogether, affecting 323 databases for which data was not received on time.²¹

²⁰ Many of the issues to be addressed have been noted consistently by the SEFIP team in its accompanying reports over the years, especially those related to data and responsiveness.

²¹ TCU (2020, paragraph 113).

State and local entities participate in the FCFP on a voluntary basis and the degree of participation varies from year to year, making oversight difficult and affecting coverage of the system. The teams managing LabContas and SEFIP work hard to clean and address inconsistencies in the data, but without an integrated database it is difficult, if not impossible, to fully resolve these issues.

Difficulties with coverage and consistency of the database can generate false positives, or irregularities that are not necessarily real. On average, false positives account for roughly 36 percent of those irregularities that have received responses over the 2015–2021 period. This can reduce the credibility of the system and lead to wasted time and energy of all involved in investigating. There is thus a high priority to be placed on improving and strengthening the databases that are inputs into the FCFP system, especially the creation of an integrated data system that covers the public payroll.

Looking forward, the TCU has plans to draw on a database under development by the Ministry of Economy called eSocial. In addition to the entities that are already on SIAPE, this database will include payroll data from all public and private employers and mixed-economy companies, covering many of the agencies in Extra-SIAPE and RAIS. The assumption is that the use of the eSocial system will allow the TCU to automatically download data that is current and built around consistent databases, thereby avoiding many of the data quality issues that currently affect the FCFP system. It will also draw on data that is already being collected and therefore reduce the burden on partner agencies. Initial efforts have been made to draw on the early versions of eSocial and it is expected that they will continue to be developed and perfected until 2025. The eSocial database may help to address some of the recurring and fundamental data issues that have been affecting the FCFP and every effort should be made to keep development and sharing of the eSocial database on track. Additionally, consistent access to subnational databases could assist the TCU in working with TCEs and TCMs in managing follow-up and addressing systematic issues.

■ **RESPONSIVENESS OF PUBLIC INSTITUTIONS TO THE IRREGULARITIES REPORTED BY THE FCFP**

As detailed in the sections above, the FCFP has developed automated systems that highlight a large number of irregularities along a series of 39 audit trails grouped in thematic areas. Once these irregularities are identified, the relevant agency or unit is meant to investigate the irregularity to determine if it is indeed accurate and respond to the TCU with its classification of the case and follow-up measures. However, low response rates and slowness in resolution

times have been an issue for the system since its inception. On average the response rate over the 2015–2021 period is 50 percent, with a low of 19.2 percent of irregularities receiving responses in 2017 and a high of 56.3 percent receiving responses in 2018 (data in 2015 is an anomaly given it was the first year of the system). In 2020 and 2021, 33 and 42 percent of the irregularities identified received responses, respectively (on average, 40 percent of responses were accepted and regularized).

As early as 2017, explanations for low response rates and slow follow-up have been included in the accompanying reports. One element of a lower-than-desired response is the learning curve—the need for counterparts to register and familiarize themselves with the FCFP system. Another factor relates to the high number of cases and the need for the partner agency to investigate each case individually every month. Still another may be that entities may face audits from other bodies, such as the CGU, that also require time and energy to respond to. It can also be difficult to get information from individual beneficiaries and some beneficiaries go to the judicial powers in order to maintain benefits, whether they qualify for them or not. Agencies of the public administration generally are inclined to give ample opportunity for beneficiaries/citizens to defend themselves against claims of irregular payments or benefits. A separate issue relates to shortages of qualified staff to analyze each case, particularly during the pandemic.

Over the years the TCU has analyzed and tried different mechanisms to improve response rates. In 2018, the TCU highlighted the units with the highest number of pending cases, including the Ministry of Defense, Ministry of Health, Ministry of Transport, and even the Ministry of Planning and Management (TCU, 2020). The TCU called for the creation of action plans to address the pending irregularities. In 2019, FCFP followed up on these action plans and found that they had not been fully implemented. Separately, in 2020 FCFP examined response times and found that while 51 percent of entities had response times below the average response time of 194 days, 21 percent of entities had response times above 282 days (TCU, 2020). The 2020 report also highlighted specific actions taken to improve these results, including: training responsible agencies with the tools and competencies to follow up quickly and efficiently, adopting methods to assure an adequate degree of certainty and respect for administrative processes regarding the required clarification of irregularities, prioritization of irregularities that have been awaiting clarification for a longer period, and greater engagement with entities that have a higher-than-average resolution time.

Although the FCFP makes significant efforts to facilitate the responsiveness of entities being controlled, there remains a fundamental and underlying asymmetry between the cost of identifying irregularities through the automated system—which has become almost costless as the system has been developed—and the costs of responding to the irregularities raised.

With the development of the databases and digital techniques, it has been possible to bring identification of irregularities to scale. The resolution of cases, however, requires non-digital as well as digital tools—not least of which is dealing with each case individually, engaging beneficiaries to understand the situation, understanding the legal basis of the situation, and potentially leading with a judicial case.

While entities can insert information and clarifications into the FCFP's e-Pessoal system, there is still a need for analog business processes to occur before a case can be resolved. As entities struggle to meet the demands of responding to the system, staffing and financial resources can become a constraint, as can the lack of effective business processes to resolve irregularities. Entities may also be subject to similar requests from other control entities that increase and/or complicate their workload if the requests are not identical. Entities may choose to back away from participation in the system or simply do the best they can with the resources they have, even though cooperation with the investigation is obligatory.

Some effort to strengthen the business processes and resources that go into the resolution of irregularities on the part of the entities being audited could therefore have a considerable impact on the effectiveness of the FCFP, both in resolving irregularities and in improving the financial benefits of the system.

■ **ADVANCING STRUCTURAL AND POLICY CHANGES**

Through the FCFP system, audit of the public payroll is now able to identify common issues across a very large number of institutions. Recent cycles have grouped the irregularities into eight themes: personnel actions and registration issues, duplicate payments, payments to people who have died, violations of the salary ceiling, illicit or incompatible payments, jobs held by prohibited persons, undue payments of benefits, and undue payments of pensions. The accompanying reports to the cycles have also taken deep dives into various themes to examine them more closely and provide suggestions to promote better results. However, given the nature of the TCU's role and mandate, the focus of the FCFP has largely been on the resolution of individual irregularities. In addition to this valuable function, the FCFP could play a wider and more

strategic role in informing discussions on the structural and policy changes that are needed to close gaps and loopholes that allow for irregularities in the payroll to emerge in the first place.

While the TCU has provided support to the team developing the FCFP and given it the space to innovate and develop the system, it could also encourage the FCFP to inform other aspects of the TCU's work. For example, when financial audits are undertaken of ministries such as health or education, it is not evident that findings from the FCFP are brought to bear in the audit's assessment of payroll. These findings might help to identify systemic issues or irregularities that could be addressed through structural changes and lead to more lasting results.

Likewise, while the TCU's function is to serve as an independent auditor, it could also collaborate more closely with the CGU. Communication between external and internal audit entities on common issues and alignment of business processes could potentially reduce the number of demands on the staff tasked with responding to audit questions and perhaps help to improve responsiveness. It might also lead to greater effectiveness in suggesting policy changes that could lead to systematic improvements in payroll functions. Finally, the information derived from the FCFP findings could inform the units responsible for management of the payroll in the federal administration, Congress, the judiciary, and the Attorney General's Office, where structural reforms might be most beneficial for enhancing payroll management and strengthening compliance with the rules of the system. In sum, the FCFP has more to offer than the financial benefit brought about by the resolution of individual cases. The scale it has achieved in the identification of problems could also help bring solutions to these issues at scale.

■ SUSTAINABILITY OF THE TEAM AND ITS WORK

The SEFIP team is a small, agile, and highly dedicated team. As noted earlier it consists of six professionals, some with experience in data science, some specialized in payroll inspection, and one full-stack developer. Three members of the team are responsible for analyzing irregularities. A challenge for the FCFP in the future is that each staff member brings specialized expertise, and staff turnover may affect SEFIP's ability to effectively manage the system.

■ LICENSING POLICY

The main components of the systems that support the work of inspecting the payrolls depend on the licensing policy of the software providers, such as Microsoft in the case of the SQL server and Oracle in the case of e-Pessoal and

Módulo Índícios. There is currently no code-sharing policy with other courts and partners. Instead, the system has a policy for providing external access to tools, notably e-Pessoal and the LabContas systems. The FCFP system is thus vulnerable to the software vendors' pricing policy.

The continuity of the work depends on the pricing policy of the solution providers, so that very large changes in product costs may make the model unfeasible in the future. Despite these risks, it should be noted that some components of the FCFP system are licensed under open-source protocols such as the Jupyter Project, making them freely usable and distributable. In the future, it would be advisable to increase the adoption of open-source solutions on the main parts of the system as well. This would facilitate both the sustainability of the project as well as the expansion of collaboration both internally at TCU and with external partners.

■ PRIVACY AND CYBERSECURITY

Although most of the databases used by the FCFP draw on data that is public, the system does access sensitive personal data that is not anonymized, since the TCU is fulfilling a legal obligation backed by the Constitution. However, the TCU also adheres to the Law on the General Protection of Data (Federal Law No. 13.709, 2018) and its interpretations (Federal Government Decree No. 10.046, 2019). In order to mitigate potential risks, databases with the personal data of public servants are divided into two versions: one with complete data that includes information on dependents and information on items such as pensions and loans and accessible only by SEFIP and another database that contains only very basic personal data like social security number (CPF), work area, and salary that is available to all TCU auditors.

The Federal Supreme Court recently weighed in on parameters for sharing data among federal bodies (ADI 6.649 and ADPF 695, September 2022), in a decision that may impact the FCFP's work. While the TCU as a whole has systems in place to prevent cyberattacks, consideration of the potential implications of a cyberattack on the FCFP system and methods to protect against its impact on public servants is a challenge that the FCFP may wish to take into account in its future work plans.



CONCLUSIONS AND RECOMMENDATIONS

The development of the system for the continuous audit of the public payroll by the TCU-SEFIP in Brazil has been an ambitious undertaking that since 2015 has successfully forged new ways of approaching audit of the public payroll.

The FCFP supports oversight of almost 600 public bodies and has generated savings exceeding R\$2 billion (US\$515 million) since its inception. Perhaps more important, it has generated a new way of thinking about audit of the public payroll, generating a shift away from top-down “punitive” approaches of payroll audit in a small number of agencies in any given year towards an approach that seeks to share information with agencies across the administration, creating an incentive for them to identify and auto-correct issues that arise in a continuous process. At the same time, by identifying key irregularities across the system, the FCFP creates an opportunity to address structural issues that affect the public payroll.

The development of the FCFP has required perseverance and persistence in the resolution of issues and continuous efforts to seek improvement of the system.

The small, dedicated team working on the FCFP has advanced improvements in data quality and made consistent efforts at technological innovation and definition of audit trails to make the system work more efficiently and effectively. It has also made efforts to engage participants in the FCFP to educate them and support them in utilization of the system so that its performance can be improved. The FCFP is an important part of the TCU’s overall approach, called Governing-IT, to innovate in the use of technology in order to achieve better audit results and greater impact that benefits the citizens of Brazil.

As seen in the previous section, there are opportunities to continue enhancing this effective model. For example, data inconsistencies, lack of integration of databases, and delayed delivery of data from different entities covered by the FCFP continue to pose a challenge to the identification of irregularities, leading to a high level of false positives. Low and slow response rates on the part of agencies covered limit the ability of the system to address irregularities and achieve greater savings. About 40 percent of total irregularities identified receive a response from the relevant entity; of those, about 50 percent of irregularities are accepted (and therefore eventually regularized) by the audited entities. As noted above, there is an asymmetry between the relatively low cost of generating information on irregularities (thanks to innovation and digital tools) and the relatively high cost of actions required to address those irregularities by public sector institutions. Addressing this asymmetry will be important to further improving the FCFP’s effectiveness. While the focus of the FCFP is on identifying and correcting individual irregularities, the system could potentially be leveraged more to support structural changes and reforms that might close the gaps that allow irregularities to persist systemwide.

Stronger coordination with other entities that manage and oversee the public payroll in the Brazilian system and perform functions similar to the FCFP should be pursued. The proliferation of control bodies, sometimes described as “control inflation,” may negatively affect the responsiveness of government entities. The CGU, SGP, and the Federal Revenue Authority at the Ministry of Economy all play a role in payroll management and oversight of payroll—and they each use their own systems to carry out these functions. Development of these systems has occurred in a siloed fashion without much communication across the groups. Such communication and collaboration could help strengthen the effectiveness of the payroll management system as a whole. At a minimum, it could reduce the burden of work for the entities being supervised and perhaps improve their responsiveness.

The FCFP is also vulnerable to some underlying risks. Should the providers of the key software used in the system change their licensing procedures, it could affect the cost or ability of the FCFP to operate. Given the personal nature of the data in the system, measures to prevent hacking and misuse of the data must be continually updated. As the system is further developed and institutionalized, steps will need to be taken to ensure the continuity of staffing in the unit that oversees and develops the FCFP and shepherds follow-up actions. Six people to manage the entirety of oversight of Brazil’s civil service payroll may not be sufficient.

As the TCU seeks to build on the work carried out to date, it may wish to consider the following recommendations:

RECOMMENDATION 1: Step up the pursuit of integrated and consistent databases.

The system developed to identify and address irregularities in the public payroll is only as good as the data that it receives. The range of federal administration bodies covered by the FCFP—from the executive branch and Congress to the judiciary and the Attorney General’s Office—requires a vast amount of information on public positions, salaries, benefits, and schedules to be incorporated into the system, not to mention the oversight of payments to pensioners. Inconsistencies in the databases are the principal explanation for the 30 percent rate of false positives found in the data. While data from SIAPE is downloaded automatically by the TCU, data from Extra-SIAPE, RAIS, and other partners requires time and effort on the part of the audited entities to share the data on a monthly basis. While TCU’s oversight of the federal administration is mandatory, there appear to be few consequences if data is provided late or not at all.

Efforts to develop and use the eSocial platform are very important and should be continued. A successful expansion of eSocial could help ensure automatic downloading of consistent data files across all branches and levels of government,

creating huge gains in the consistency and quality of the data that is one of the foundations of the FCFP system. As an automated system it would also significantly reduce the burden on entities to provide monthly data. Given that many parts of the government still use their own customized systems, and some (such as municipalities) still use spreadsheets, both financial and technological incentives for implementation of eSocial should be considered. These could include resources for purchasing the needed IT systems and training staff to use them. While such an effort is an enormous undertaking across a public sector the size of Brazil's, quality data is the foundation of any automated control process.

RECOMMENDATION 2: Consider measures to improve responsiveness to the system.

While the FCFP system has excelled at highlighting irregularities, responsiveness to addressing those irregularities has lagged. About 60 percent of the irregularities raised receive no response. As noted above, this may be because the processes required to investigate and determine whether an irregularity should be accepted go well beyond the digital sphere. Investigations require staff and resources to follow up with the individuals involved, wait for responses, and work through cases that individuals may bring to the judicial system. Competing demands on managers' time may make it difficult to pursue the many irregularities that are raised. Alternatively, the issues highlighted may be the result of conflicting data that is difficult to untangle. To overcome these weaknesses, we recommend the following actions.

- **2.1 Understand what is driving the lack of responsiveness.** The FCFP unit, as part of its yearly work, regularly highlights those entities that either have not responded or do not respond in a timely manner. Although action plans have been required and training and outreach have been offered, the overall response rate for irregularities remains at about 40 percent. A survey of entities about why they do not respond could be helpful in designing a set of targeted measures to encourage managers to respond. Alternatively, the system could be adjusted to focus on those areas in which responses are made, in order to improve its impact. There is currently no procedure to sanction entities that do not respond to a notification from the FCFP. Clearly, the credibility of the FCFP system would be enhanced if response rates were improved.
- **2.2 Continue to promote greater collaboration among the various entities across the government that make up the system for management and oversight of the payroll.** While both the TCU and the CGU have authority to audit the public payroll, continued efforts to strengthen coordination and complementarity could be highly beneficial. Such measures could reduce the

workload (and perhaps the confusion) of those responding to each system. Regarding databases and systems, greater cooperation between the TCU team and DESIN in the Ministry of Economy, and the team working on SA3 could bring benefits to each group that might generate an improvement in responsiveness. Sharing approaches, information, and results across these groups could help improve the performance of all of them.

Holding an event that brings together the entities that are part of the payroll management and oversight ecosystem to share methodology, coverage, systems, and results could be the starting point for mutual understanding of how each entity is undertaking, analyzing, and systematizing their work and for considering what responses each entity requires from government managers. The event could form the basis of a publication as well as the creation of a permanent forum to discuss themes related to management and oversight of the payroll including: (i) what is working well in the current system, (ii) relevant international examples, (iii) development of innovative solutions to common problems, (iv) sharing information and databases, and (v) the implementation of joint actions to make the system work more effectively. Such efforts could reduce the burden faced by managers and also bring more weight to findings on systematic structural or policy changes that would help reduce irregularities.

- **2.3 Encourage the FCFP to inform other aspects of the TCU's work.** For example, when financial audits are undertaken of ministries such as health or education, it is not evident that findings from the FCFP are brought to bear in the audit's assessment of payroll. Giving more visibility to FCFP with audited institutions in other contexts can reinforce its importance. These findings might also help to identify systemic issues or irregularities that could be addressed through structural changes and lead to more lasting results.
- **2.4 Consider whether the range of audit trails or the coverage of institutions could be focused more narrowly in order to improve response rates in the system.** As noted above, the identification of irregularities through the FCFP system is almost costless, but the development of responses and resolution of irregularities requires analog responses on the part of managers. If the goal is to improve the impact of the system in terms of resolving issues, reducing the number of audit trails and finding methods to improve responsiveness to those findings could be helpful. Once those issues are resolved, the FCFP could move on to the next set of audit trails. The work to date by the FCFP team has each year focused on one or two thematic issues to be addressed, but the breadth and coverage of the

system as a whole is deliberately broad. This may hinder responsiveness to the system, as there may be insufficient resources available to respond to each and every identified irregularity.

RECOMMENDATION 3: Define how the FCFP system can inform structural and policy changes that are required to the payroll system. In its current form, the work of the FCFP is focused on resolution of individual irregularities. Although this is important in the TCU's role as auditor, the most important impact of the system is likely to come from the identification of systemic weaknesses that lead to irregularities and proposing measures that could help to overcome these weaknesses. Since this is not a standard role for the TCU, there is discussion and perhaps differences of opinion as to whether it is an appropriate function. But failing to draw on the high-level information that the system provides would be missing a huge opportunity. Pursuing this recommendation would likely involve bringing on board one or two staff with the analytical background to undertake this work and the skills to collaborate with other parts of the payroll ecosystem.

RECOMMENDATION 4: Undertake measures to address risks to the sustainability of the system. The first of these risks relates to the FCFP's team, composed of six people. Forward planning is required to assure that the skills required to maintain and further develop the FCFP remain in place and that it is further institutionalized. The TCU may also consider adding staff to analyze and present the implications of the FCFP's findings for use in future discussions of structural policy change in public payment systems. A second issue is related to software licensing. As noted above, the development of the system was based on existing systems and licenses used within the TCU. The team should consider whether these arrangements are still suitable. At a minimum, back-up arrangements should be developed to prepare for a major change in the pricing or licensing of the software that underpins the system. Finally, measures should also be considered for addressing privacy issues that arise out of rulings and interpretations of the Law on the General Protection of Data and the risks that might be posed by a hack of the system.

RECOMMENDATION 5: Use Brazil's presidency of INTOSAI as an opportunity for the TCU to advance the agenda on data-driven digital innovation to improve spending practices and to prevent fraud and corruption. Also, build on FCFP's innovations to spark the exploration of emerging issues. The TCU has been very innovative in applying digital technologies to advance effective auditing and the detection of fraud and corruption. Few other supreme audit institutions have completed payroll audits. The presidency of INTOSAI is an important opportunity for the TCU to share information about how the culture of digital innovation came about, the underlying people and processes that led to its development, the lessons

learned from its experience, and its implications for auditing practices outside of Brazil. Given its results and the similar fiscal contexts in other countries, FCFP can be a useful reference for other supreme audit institutions in Latin America and the Caribbean and the world.

Finally, the FCFP experience could also spark the exploration of other emerging issues. These include considering the role of the TCU in data audits to assure the quality of data; considering moving from closed-source to open-source technology to improve transparency of the system; moving from reactive analytics to predictive analytics to help establish risk maps and red flags before transactions take place; and drawing on the available data to develop analyses of the gap between public and private salaries, pay scales, and productivity.

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