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Measuring Cash Management Performance: The Case of Türkiye

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Acronyms

CBRT	Central Bank of the Republic of Türkiye
CG	Central government
COP	Community of practice
GG	General government
IMF	International Monetary Fund
KPI	Key performance indicator
OECD	Organization for Economic Cooperation and Development
PEFA	Public Expenditure and Financial Accountability
PEMPAL	Public Expenditure Management Peer Assisted Learning
TCOP	Treasury community of practice
TL	Turkish lira
TSA	Treasury single account

Acknowledgments

The paper[1] was developed per request of the PEMPAL[2] Treasury Community of Practice (TCOP) Executive Committee following the TCOP Thematic Meeting on Strengthening and Measuring Treasury Performance in Cash Management and Forecasting, in Tirana in 2024.[3] It responds to the high interest demonstrated by the TCOP members in using key performance indicators (KPIs) in treasury operations and the experience of Türkiye presented at the meeting. The paper was prepared jointly by Mr. Barış Can, Deputy General Director, General Directorate of Public Finance, Ministry of Treasury and Finance of Türkiye, and Ms. Elena Dobrolyubova, PEMPAL TCOP Resource Team member, World Bank. The authors are grateful to Ms. Elena Nikulina, TCOP Resource Team Leader, Mr. Mike Williams, and Mr. Mark Silins, TCOP Thematic Advisors for the valuable advice and comments provided. Ms. Mingul Seitkazieva and Ms. Kora Reichard, PEMPAL Secretariat, contributed to preparing the paper for publication.

1

Introduction

The role of government cash and liquidity management in ensuring sound public finance cannot be overestimated. It serves the higher objective of smooth and timely budget execution and is crucial for the effective and efficient use of public funds. Strong cash management and cash forecasting practices help governments to reduce borrowing costs, and the carry cost of holding excess cash balances, and to raise the efficiency of public spending. As demonstrated by the TCOP thematic survey on the government treasury single account (TSA) and cash management in PEMPAL countries (PEMPAL, 2021), improving cash management practices is highly relevant to the treasury reform agenda in most PEMPAL countries.

Improving cash management and forecasting practices calls for performance measurement frameworks that can help monitor progress and take timely actions if any deviations or performance shortfalls are recorded. Operational KPIs measured regularly are crucial to support the decision-making on investing surplus cash or short-term borrowing to cover temporary gaps between cash inflow and outflow, and also for developing the policy framework, for example determining the target cash buffer. Thus, countries need to develop specific KPIs reflecting operational needs and cash management development priorities. While some countries publish cash management KPIs, the data on national approaches to measuring cash management performance remains incomplete (Varea & Arosteguiberry, 2016; Williams, 2024).

This paper aims to contribute to bridging this knowledge gap and presents the case of Türkiye which has one of the most advanced systems of KPIs in the PEMPAL region (PEMPAL, 2025). We believe that the Turkish approach will be relevant for national treasuries both within and outside PEMPAL countries.

2 Measuring Cash Management Performance in Türkiye: Overview

In Türkiye, the treasury has developed a comprehensive set of indicators covering the higher objective and core aspects of cash management outlined by Williams (2024), including the TSA system, cash forecasting, and active cash management. In addition, cash programming issues related to the efficiency of cash requests are a part of the cash management performance framework (**Table 1**).

All cash management KPIs have target values, while the frequency of measurement depends on the nature of the performance indicator. For instance, KPIs tracking progress in treasury modernization, such as expanding the coverage of the TSA or reducing expenditure arrears, are typically evaluated on an annual or quarterly basis. These metrics provide a broader, long-term view of strategic improvements

Table 1. KPIs for Measuring Cash Management Performance in Türkiye

Area	KPIs	Targets	Frequency
High-level outcome	Discrepancy between accrual and cash-based non-interest expenditures (% of GDP)	<0.5%	Annually
	Percentage of expenditure arrears	<3.5% (for total expenditures), <2.5% (for non-interest expenditures)	Annually
TSA system	Coverage of the new TSA[4] (number of institutions)	Defined in the Ministry of Treasury and Finance Strategic Plans	Quarterly
	Efficiency of the TSA function[5]	Establishing full-fledged TSA	Annually
	Expenditures in the TSA / total expenditures	>95% of CG, >85% of GG	Annually
	Revenues in TSA / total revenues	>99% of CG, >85% of GG	Annually

[4] The new TSA was established in 2018 in addition to the core TSA comprising central government institutions (see **Box 1** for more details).
[5] Not publicly available.

Area	KPIs	Targets	Frequency
Cash flow forecasting	Daily cash balance forecast deviation	<0.5%	Quarterly[7]
	Monthly revenue forecast deviation	<4%	Quarterly
	Monthly expenditure forecast deviation	<3%	Quarterly[8]
	Monthly cash balance deviation	Does not exceed threshold X (set in absolute amount)[6]	Daily
Cash programming	Efficiency in cash requests system	100%	Annually
Active cash management	Transaction costs/expenditures	<0.025%	Annually
	Rate of return on cash holdings	Close to the rate of market return	Monthly

in government cash management. In contrast, operational indicators that measure the precision of cash flow forecasting or the rate of return on temporarily invested funds require more frequent monitoring, often on a daily or weekly basis, to ensure timely adjustments and to maintain optimal liquidity levels. The dynamic nature of these indicators reflects their direct impact on day-to-day cash management

efficiency. The frequency of treasury reporting is generally structured to align with the varying demands of decision-makers. Thus, the treasury cash statement report is prepared twice a day, annual cash flow forecasts and cash balance are updated and reported daily, whereas the reports on the distribution of financial resources of institutions are prepared weekly.

[6] Not publicly available.

[7] The indicator is measured daily but published quarterly.

[8] The indicator is measured monthly but published quarterly. CG – Central Government, GG – General Government.

3 Core Elements of the Cash Management Performance Framework in Türkiye

3.1. Measuring High-Level Outcome of Cash Management in Türkiye

The high-level outcome of cash management is to ensure that cash is available to facilitate the smooth execution of the budget (Williams, 2024). To measure this outcome, the treasury of Türkiye uses two performance indicators: the discrepancy between accrual and cash-based non-interest expenditures (percent of GDP) and the percentage of expenditure arrears.

Monitoring the first indicator prevents any build-up in arrears and thus avoids a surge in the following year's expenditures, with the liquidity risks that entails. Recurring arrears also affect the cost and quality of government procurement. Suppliers adjust their

prices to reflect the risk of late payment and may avoid government contracts altogether, reducing the participation of quality suppliers. In addition, late payments undermine the government's credibility, not only with suppliers and business partners but also with financial institutions and citizens. This loss of confidence can lead to higher borrowing costs, reduced access to credit and lower tax compliance. Arrears may also create governance challenges as public finance managers must exercise discretion in deciding which obligations to pay first when resources are scarce. Overall, public arrears undermine economic stability, procurement efficiency, public confidence and the integrity of governance, and require strong fiscal discipline and transparency to effectively address their impact (Utz et al., 2022).

In 2018-2022, the discrepancy between accrual and cash-based non-interest expenditures remained below the target level of 0.5% of GDP (**Figure 1**).

Figure 1. **Accrual and Cash-Based Non-Interest Expenditures in 2018 – 2023 (billion TL)**
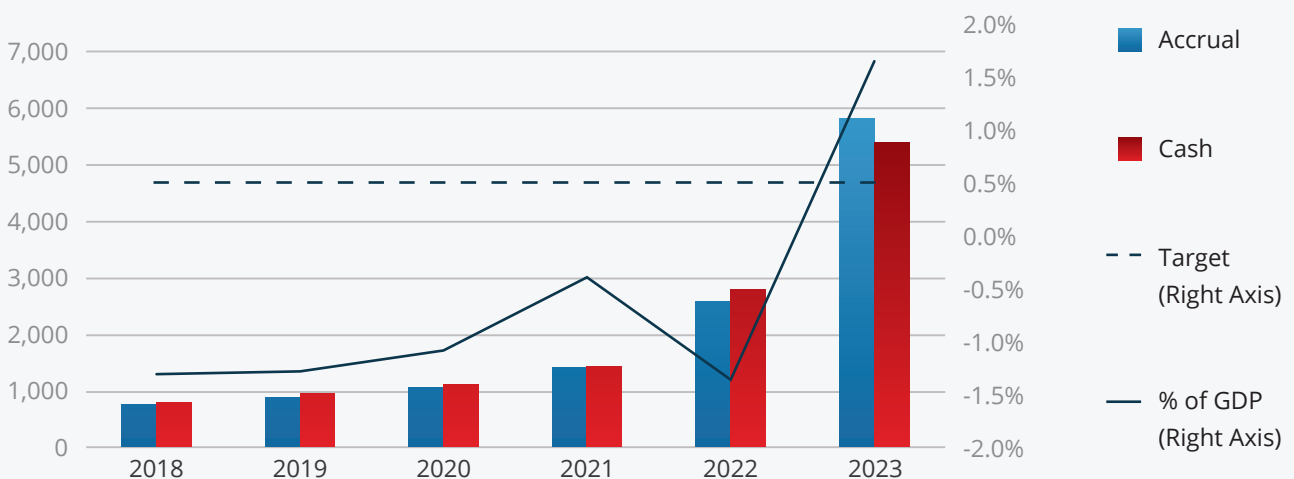
Source: authors.

In 2023, as a result of the expenditure surge related to the consequences of the earthquake, the target was exceeded and the discrepancy reached 1.6% of GDP. This reflects the challenges of managing unforeseen events, which can strain cash flow and cause deviations from targets. Despite this, the long-term trend remains positive with previous years consistently staying within the target range. Keeping arrears below 0.5% of GDP is crucial for maintaining fiscal discipline and ensuring that expenditure is closely aligned with the budget.

Expenditure arrears can place a heavy burden on cash management, particularly if they are a significant percentage of total expenditure. Keeping expenditure arrears under control is essential for ensuring effective cash management and avoiding the burden of accumulated obligations. Since arrears impose an additional burden on cash management for the following year, it is important to set objectives and monitor them as a KPI. In Türkiye, the percentage of arrears is estimated for total expenditures and for non-interest expenditures. The data shows that, if the earthquake-related expenditures are excluded, the percentage of arrears has remained within the target

level since 2017, both for total expenditures and for non-interest expenditures (**Figure 2**).

The data demonstrate that the treasury performance in meeting the high-level cash management objectives significantly improved in 2017-2022, compared to 2011-2016. The drastic earthquake in 2023 impacted treasury performance and resulted in the growth of arrears and the larger discrepancy between accrual and cash-based expenditures. However, since the expenditure arrears remained within manageable limits, the high-level cash management outcome was achieved; further improvement is expected in 2024.

3.2. Measuring the Performance of the TSA System in Türkiye

Expanding the TSA coverage has been one of the major treasury reforms in Türkiye (**Box 1**) that has yielded significant benefits. The objective of

Figure 2. Percentage of Expenditure Arrears in 2011-2023
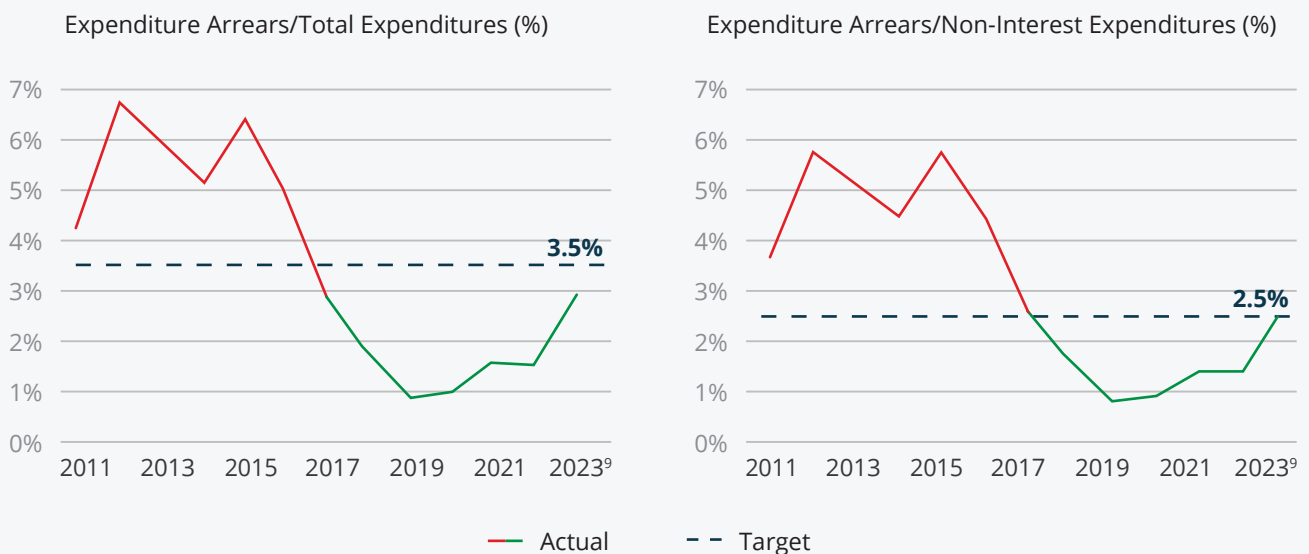
Source: authors.

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[9] Excluding the earthquake-related expenditures.

Box 1. TSA System in Türkiye

In Türkiye, there are two different TSAs. The first is the **core TSA**, which was established in 1972 and covers a total of 42 central government institutions, such as line ministries and revenue administration.

The second is the **new TSA**, which was designed to manage all public resources centrally without disturbing institutions' administrative and financial rights over their resources. The new TSA structure is responsible for bank-customer relations between the Ministry of Treasury and Finance and the institutions, along with transactions between TSA entities. The new TSA covers the financial resources of the central government institutions not covered by the core TSA, such as regulatory and supervisory agencies, universities, social security institutions, EBFs, and revolving funds and special accounts of these institutions. Currently, 277 public institutions have been added to the scope of the new TSA. Overall, 319 public entities are included in the TSA system (comprising the core TSA and the new TSA).

The funds between the core TSA and the new TSA are fully fungible.

the reform was to establish a fully-fledged TSA and manage it effectively, by preventing the idle retention of public funds in bank accounts and reducing borrowing costs, as well as minimizing the cost of maintaining a formal cash buffer. Therefore, indicators related both to TSA coverage and to TSA efficiency are used.

To measure the TSA coverage, three KPIs are used showing the number of institutions covered by the new TSA, the ratio of government revenue collected into the TSA compared to total revenue, and the ratio of government expenditure executed from the TSA compared to total government expenditure. By November 2024, 277 public institutions were included in the new TSA, as compared to only one such institution in 2018. The target of 260 public institutions in the TSA was thus exceeded (**Figure 3**). This steady growth shows that the implementation of the TSA has been a success, with more public institutions now benefiting from centralized cash management. Currently, almost all public institutions in Türkiye, except for local governments, are covered by the TSA.

**Figure 3.** **Number of Public Institutions Included in the New TSA**
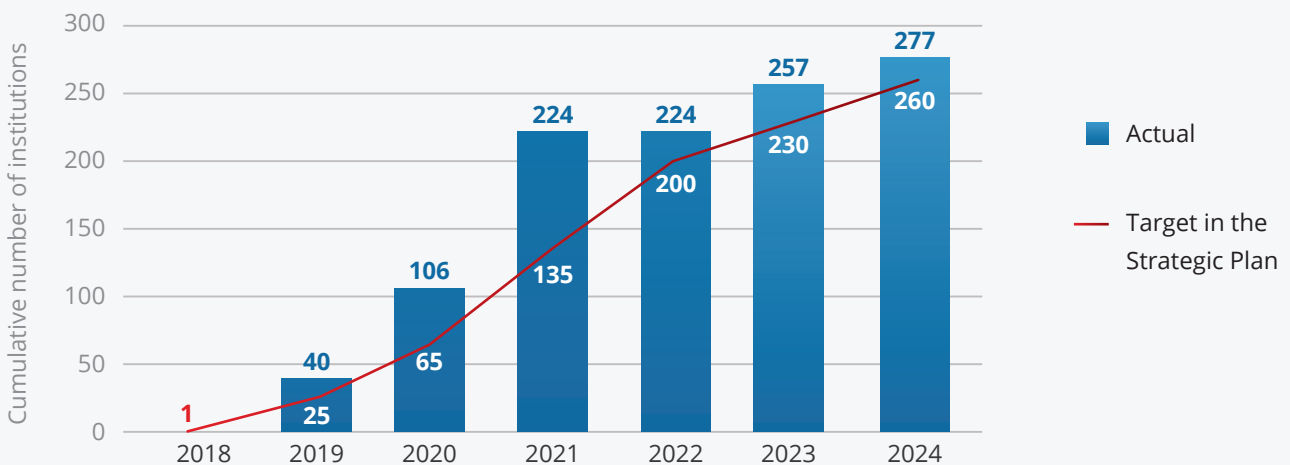
Source: authors.

Collecting public revenues to the TSA and executing public expenditures through the TSA helps to optimize cash management, enhance transparency, improve revenue forecasting, and ensure more efficient allocation and utilization of government funds. In this respect, it is crucial to analyze the percentage of expenditure or revenue realized within the TSA scope — see **Figure 4**. Following the new TSA's introduction, the share of expenditures and revenues has increased significantly. In 2023, 93.1% of general government revenues and 99.9% of central government revenues were collected to the TSA, compared with a much lower 70.2% and 90.2% in 2018. Similarly, 92.1% of general government expenditures and 99.9% of central government expenditures were executed through the TSA in 2023 compared with a lower 62.5% and 86.4% in 2018. Both in terms of revenues and expenditures, there has been a sharp increase in TSA coverage and thereby a major improvement in centralization of cash management since 2018.

Figure 4. Government Revenues and Expenditures in the TSA System (Core and New TSA)

General Government Revenues in the TSA to Total General Government Revenues, %

General Government Expenditures the TSA to Total General Government Expenditures, %

Central Government Revenues in the TSA to Total Central Government Revenues, %

Central Government Expenditures in the TSA to Total Central Government Expenditures, %

— TSA/Central Government   — Target
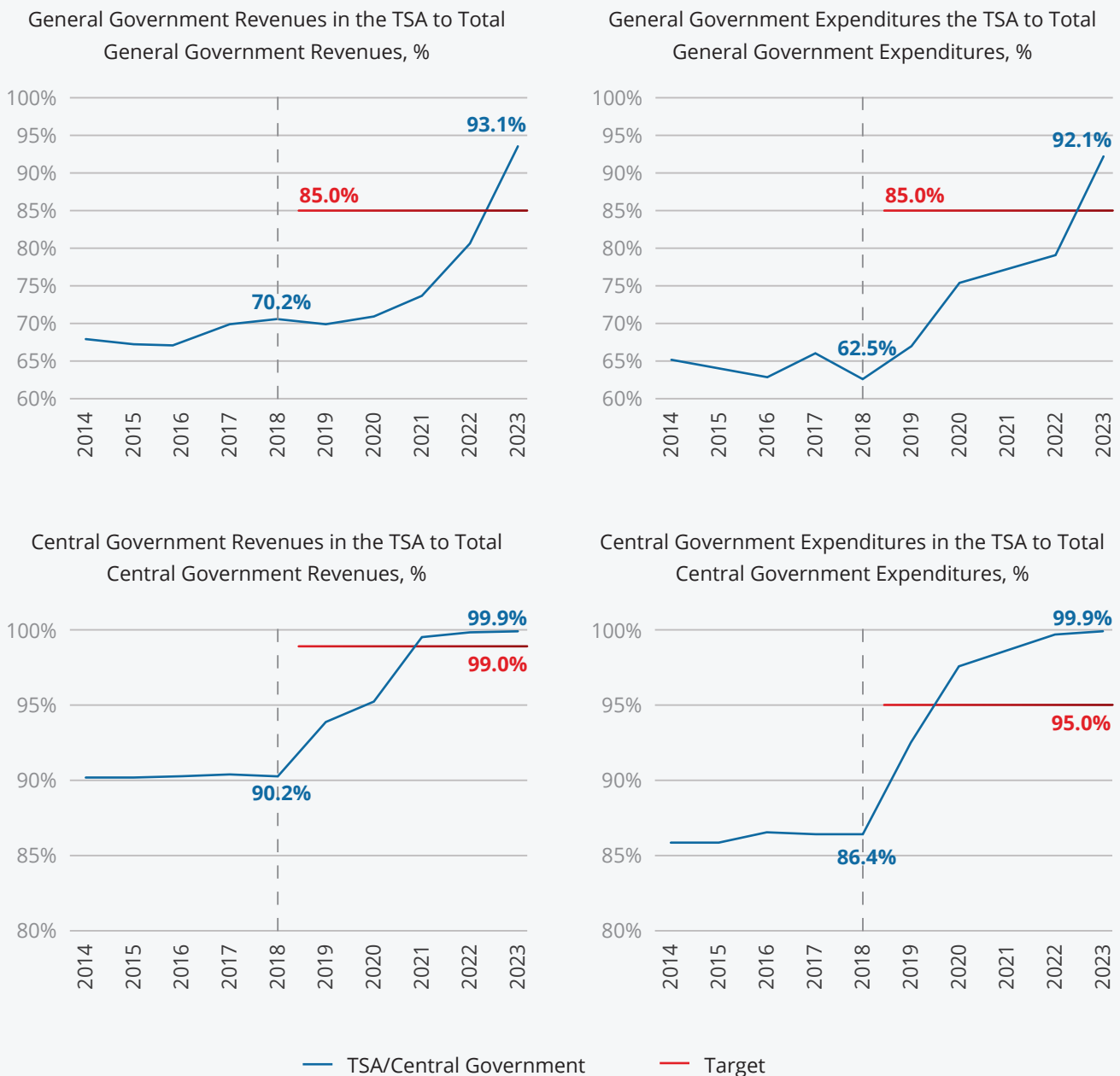
Source: authors calculations.

In addition to using KPIs for measuring TSA coverage, the Turkish Treasury has also adopted an indicator for internal use reflecting the efficiency of the TSA. This indicator aims to measure the TSA performance against the potential maximum level and also provides a long-term view of the development of the TSA (**Box 2**).

It is estimated that, by 2024, the TSA in Türkiye has reached 99% of its potential, compared to 80% in 2018 (**Table 2**). The largest improvements are demonstrated by the structural aspects of the TSA (which inter alia include the increased TSA coverage and fungibility of public funds). These improvements also impacted the third component of the index, since better TSA coverage has resulted in higher effective remuneration of the TSA. The estimates of the TSA efficiency also illustrate that it takes years, potentially decades, to develop a fully-fledged, structurally and operationally efficient TSA.

In summary, significant progress has been achieved in Türkiye since 2018 both in extending the TSA and improving its efficiency.

Table 2. Efficiency of the TSA in Türkiye

TSA Aspects	1972-2007	2007-2011	2011-2018	2024
Operational	40%	70%	90%	99%
Structural	30%	60%	70%	99%
Other	10%	50%	80%	99%
Total	**30%**	**62%**	**80%**	**99%**

Source: author estimates

Box 2. Measuring Efficiency of the TSA in Türkiye

The Ministry of Treasury and Finance of Türkiye uses a composite indicator to measure efficiency of the TSA. It takes into account the following aspects of the TSA grouped into three components:

- **Operational aspects** of the TSA (including timeliness of transactions and information, payment and collection methods, reconciliation period, the effectiveness of the sweeping mechanism),
- **Structural aspects** of the TSA (including TSA coverage and degree of fungibility), and

- **Other aspects** of the TSA (including effective remuneration, norm of legal basis, and governing authority).

For each aspect, a scoring system is appled based on the strength of each characteristic, and then these scores are weighted according to their importance. Then the components are weighted to form an index. The first two components (operational aspects and structural aspects) account for 40% of the composite indicator each, while the third component (other aspects) has a weight of 20% in the composite indicator.

## 3.3. Measuring Cash Forecasting Performance in Türkiye

Reliable and accurate cash flow forecasts are crucial for PFM as they provide critical information for decision-makers to take corrective financing or other actions, help to avoid the accumulation of arrears, and minimize the cost of carry. However, not all countries regularly measure cash forecasting performance, and it has been flagged as an area requiring further improvement (Cangoz & Secunho, 2020).

Measuring cash forecasting performance in Türkiye is based on several indicators highlighting the accuracy of cash forecasts, including daily cash balance forecast deviation, monthly deviations of revenue and expenditure forecasts, and monthly cash balance deviation (estimated in nominal terms). The daily cash balance forecast deviation is important for the

Central Bank's open market operations as it affects the level of liquidity in the market. The Central Bank of the Republic of Türkiye (CBRT) is fully informed of the amount of funds that the Treasury expects to inject or withdraw from the market on a daily basis, at least one day prior to the auction for open market operations. Keeping the cash balance deviation within the target level enables the CBRT to focus on its own tools for managing liquidity in the market (Can, 2024a). Monthly deviations of revenue and expenditure forecasts are also important for debt management and are accounted for in the Financing Program.

Over the past five years, the daily cash balance forecast deviation[10] has been consistently lower than the target, and fell from 0.8% in 2020 to 0.3% in 2023 (**Figure 5**). It is relevant to note that the target itself has also been made more ambitious over these years: the maximum allowed deviation was reduced from 1.5% to only 0.5%.

Figure 5. Daily Cash Balance Forecasting Deviations in 2020-2024
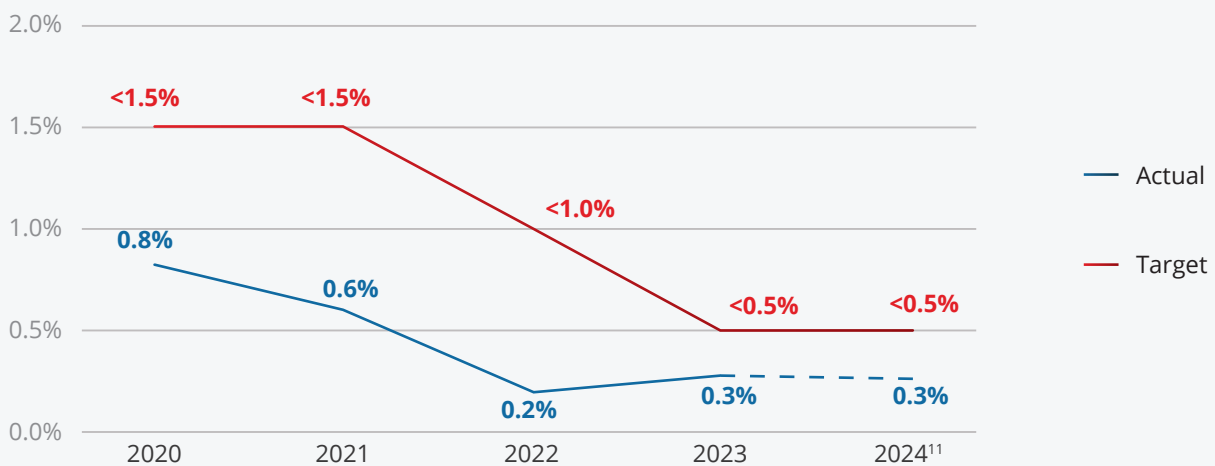
Source: authors.

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[10] Estimated as the monthly average of the deviation of actual daily cash balance from previous day forecasting.
[11] Includes the data for January – June 2024.

In addition to the daily and monthly cash balance forecast deviation, the accuracy of revenue and expenditure forecasts is measured.[12] The purpose of these KPIs is to monitor the Treasury's ability to predict the accuracy of monthly cash inflows and outflows. Accurate forecasts are essential for the Treasury to meet its fiscal obligations without over-utilizing cash reserves or incurring unnecessary borrowing. Since government revenues depend more on economic trends and therefore tend to be less predictable than expenditures, the target level for revenue forecast deviation (<4.0%) is higher than that for the expenditure forecast deviation (<3.0%). Although the targets for monthly deviation have been made more ambitious over the years, both revenue and expenditure forecasts have remained within the target accuracy thresholds (**Figure 6**).

Overall, the accuracy of cash forecasts in Türkiye is noteworthy and it has improved over the past five years. Further improvements in the quality of

cash forecasting are expected based on the use of emerging technology (i.e., artificial intelligence) in the cash forecasting process (Can, 2024b).

3.4. Measuring Cash Programming Performance in Türkiye

In addition to the top-down approach to cash forecasting, the treasury in Türkiye employs a bottom-up approach based on cash requests received from public institutions. The quality of cash requests submitted by public institutions impacts cash programming and forecasting, with implications for liquidity management and operational costs. Therefore, a special performance indicator on the efficiency of the cash request system was introduced.

Figure 6. **Accuracy of Monthly Revenue and Expenditure Forecasts in 2020-2024**

Monthly Revenue Forecast Deviation, %

Monthly Expenditure Forecast Deviation, %

— Actual   — Target
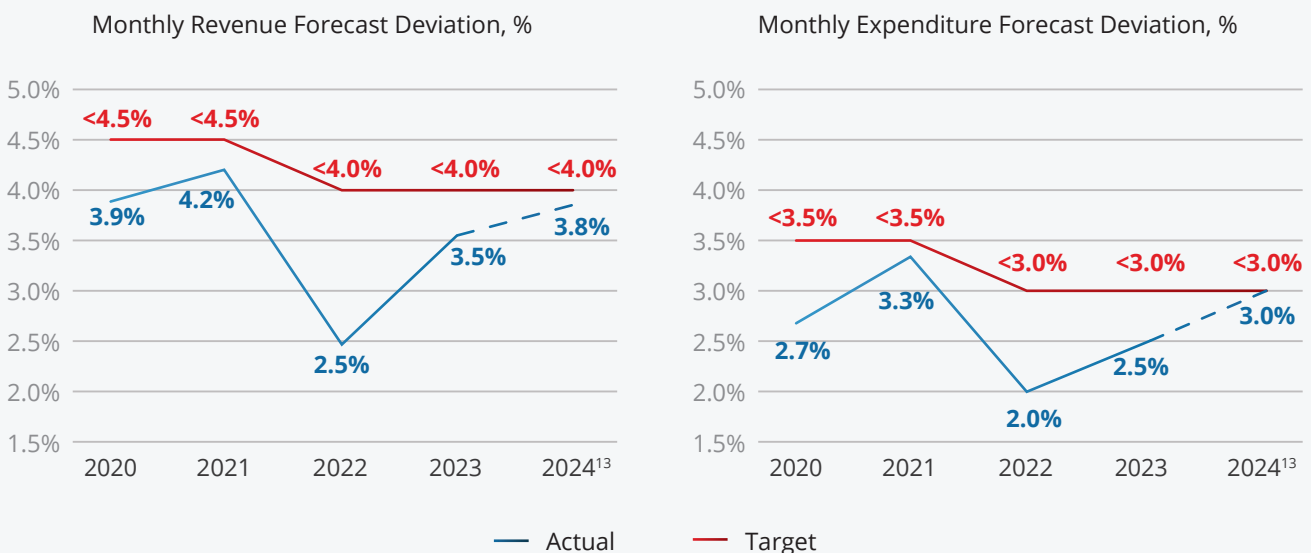
Source: authors.

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[12] The deviations in monthly revenue and expenditure forecasting are estimated based on the comparison of the actual revenues and expenditures and those included in the monthly forecast prepared at the beginning of the respective month.

[13] Includes the data for January – June 2024.

The efficiency of the cash request system is a qualitative indicator that takes account of the frequency of cash request submissions, the cash request horizon, granularity, and format. As demonstrated by the comparison of the current and previous practices, the frequency and granularity of cash requests have improved over time (**Table 3**). Furthermore, all cash requests are now submitted by the public institutions exclusively through an IT system that allows for easier analysis and processing.

The treasury also analyses the quality of the cash requests submitted by the institutions. Thus, the reliability of the cash demands made by institutions is analyzed based on the trends observed in the previous year. The cash requests are also compared with average monthly budget allocations. Furthermore, the treasury estimates how long it takes to spend the requested cash. The increase in cash balances after large (salary) payments, compared to normal trends, also highlights a possible deviation. Finally, the actual expenditures are compared with those requested by institutions in the past to estimate their execution performance. Significant deviations from trends, time taken to spend previously requested cash, the track record of low disbursements compared to requested liquidity, deviation of cash requests from average budget allocation and/or cash requests filed by similar institutions, as well as arrears, may result in corrections of cash requests in the finalized cash program of the institutions.

A detailed analysis of the performance of the institutions is important for increasing the effectiveness of bottom-up cash forecasting. The annual performance of institutions is ranked in order of success, with demand fulfillment rates of successful institutions being revised upwards, and those of unsuccessful institutions being revised downwards. Meetings are organized with unsuccessful institutions to identify structural constraints and how they can be resolved. Following a detailed analysis of institution performance, bottom-up cash forecasting has improved. The percentage of underperforming institutions has been reduced from 35-40% before 2018 to around 5-10% in 2024.

3.5. Measuring Active Cash Management Performance in Türkiye

To measure active cash management performance, the Treasury of Türkiye estimates transaction costs (as compared to total expenditures) and the rate of return on cash holdings. Transaction costs include bank service charges, such as general expenses for treasury operations, which are calculated on the basis of the relevant year's tariffs as paid to the CBRT or other public banks. The main objective is to keep the operating costs below a certain level. This type of indicator is useful in negotiations with banks. The data show that since 2014, the annual ratio of transaction costs to total expenditure has fallen five times, and the sharpest fall was achieved after 2018 when the

Table 3. Efficiency of the TSA in Türkiye

| Parameter	Previous	Current	Performance Rating	Target
Frequency of Cash Request Submission by Institutions	Weekly	Daily	▲	Establishing Effective Cash Request System
Cash Request Submission Horizon	Next Three Months	Next Three Months	▶	
Cash Request Granularity	3 Breakdowns	7 Breakdowns	▲	
Electronic Submission of Cash Requests	IT System, Excel, Email	IT System	▲	

new TSA was introduced, supporting a streamlined cash management process (**Figure 7**). Currently, transaction costs account for only 0.01% of total expenditures which is well below the target (0.025%).

The rate of return on cash holdings is another important KPI reflecting the ability of the treasury to ensure adequate returns on temporarily invested excess cash. In 2023-2024, the rate of return on the treasury holdings remained high, above the rate of

return received by individual public institutions and was close to the market rate (**Figure 8**).

The ability of the treasury to secure a higher rate of return on cash holdings largely reflects cash consolidation, economies of scale, and strong staff capacity. This complements the findings of previous research which demonstrated positive effects of the TSA on the ability of treasuries to reduce the cost of borrowing in OECD countries (Çınar et al., 2022).

Figure 7. **Transaction Costs to Total Expenditures in 2014-2023**
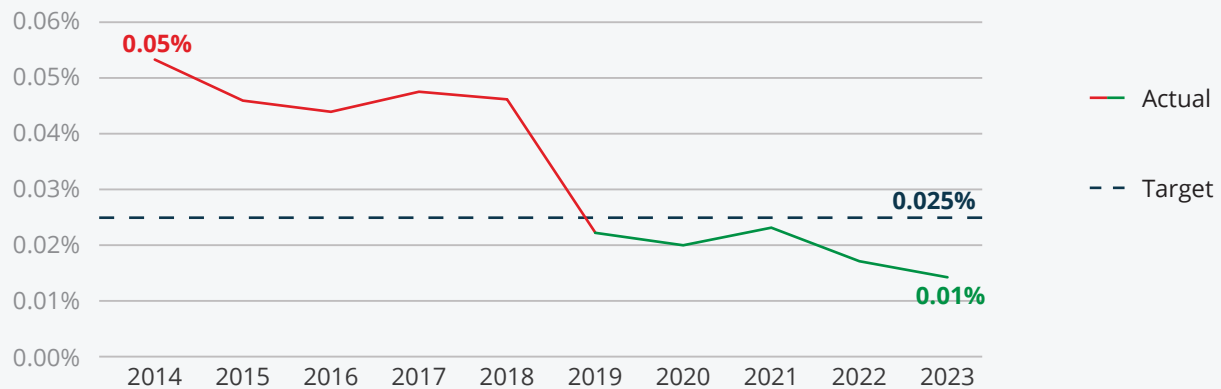
Source: authors.

Figure 8. **Rate of Return on Treasury Cash Holdings**
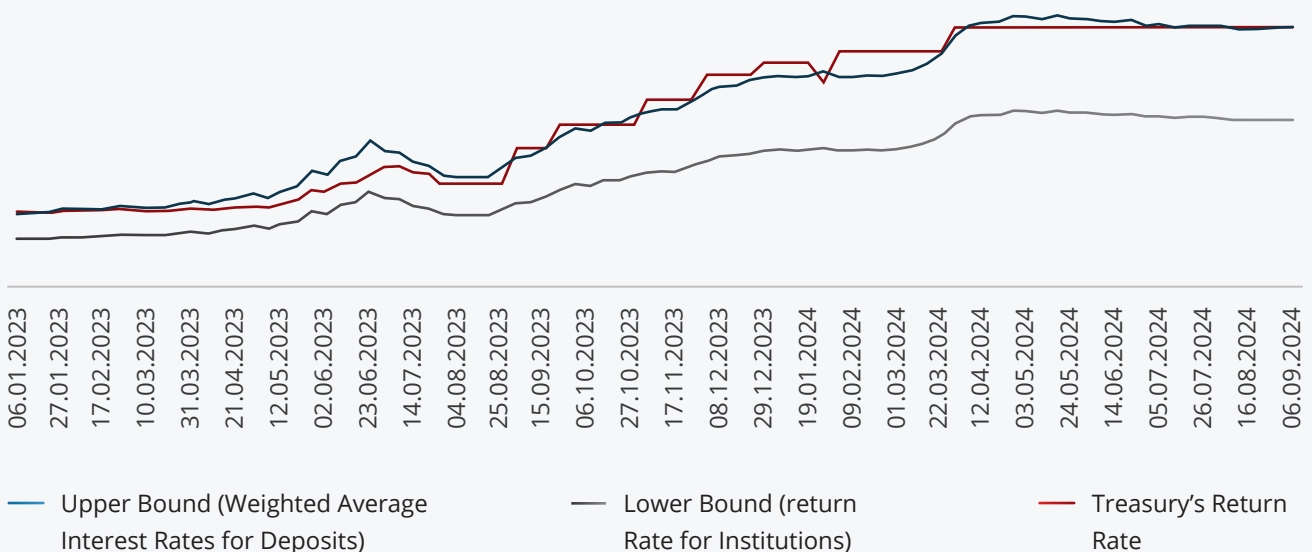
Source: authors.

4

Areas of Further Improvement

The cash management performance framework in Türkiye is already highly developed, but there are also ways to strengthen it further. Comparing revenue from interest with the costs of short-term borrowing to identify the net outcome of active cash management is one example. The analysis of the cash buffer size and the carrying costs could also be of interest. An alternative scenario reflecting the absence of the new TSA could be estimated to measure the impact of the new TSA on smoothing the cash flows. In this scenario, the Treasury of Türkiye would have to incur additional carrying costs associated with the larger cash buffer needed to ensure timely budget execution.

Incorporating the metrics used for evaluating the quality, timeliness, and completeness of cash requests into the KPIs of the officials of public institutions in charge of cash request preparation is a further option. This could strengthen financial management accountability and ultimately contribute to further cash management improvements.

5

Conclusions

Türkiye has developed a sophisticated and comprehensive approach to measuring cash management performance. It covers both the higher-level objective of ensuring smooth budget execution and the core constituent pillars, such as the TSA system, cash forecasting and planning, and active cash management. The KPIs used in Türkiye reflect ongoing operational efficiency and allow tracking of the progress in treasury reforms. This comprehensive approach helps the Ministry of Treasury and Finance and other relevant actors, such as the Central Bank, use performance information to support the decision-making process, which is especially important given the economic and other challenges.

The example of Türkiye also shows the importance of using a clear performance framework to demonstrate the results of treasury reforms, overcome institutional resistance to innovations, and consolidate the commitment to change. For the past several years, the TSA coverage in Türkiye has been substantially expanded. Such cash consolidation efforts require strong management support as they are often resisted by other public institutions (Silins, 2024). The ability of the Turkish treasury to demonstrate clear and impressive results of cash consolidation (reflected in reduced transaction costs, increased rate of return on cash holdings, decreased arrears, etc.) has contributed to gaining the political support for further TSA extension.

The KPIs used by Türkiye can be highly relevant for other national treasuries working on developing their own performance frameworks, both within and outside the PEMPAL region. Some of these indicators are in line with practices of advanced countries, such as the rate of return on cash holdings which is also used by the French Treasury Agency.[14] Some KPIs used in Türkiye correspond to the KPIs that are used by treasuries in other PEMPAL countries. For instance, the percentage of revenues to expenditures from the TSA is also used in Croatia; monthly cash forecast accuracy rates are used in Albania, Kosovo, and Georgia, while the daily TSA balance is benchmarked in Hungary (PEMPAL, 2025). However, some KPIs used in Türkiye are unique for the PEMPAL region, including transaction costs, efficiency of the cash request system, and TSA efficiency. Given the high interest in strengthening cash management and reducing transaction costs across the region and beyond, these KPIs will be of interest to other countries. Measuring performance by analyzing the same area from various angles (for instance, looking at the quality of monthly and daily forecasts and the accuracy of revenue and expenditure forecasting, looking at both timeliness, frequency, and granularity but also the quality of cash requests) is also worth highlighting.

It should be noted that while the system for measuring cash management performance in Türkiye is well developed, some further/alternative indicators can also be considered.

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[14] https://www.aft.gouv.fr/en/cash-management-performance (accessed on December 15, 2024).

Bibliography

Can, B. (2024a). Government Cash Management in Türkiye (Implementing Strategies for Supporting Central Bank's Liquidity Management). *2024 Asian Regional Public Debt Management Forum.* Available at: https://az659834.vo.msecnd.net/eventsairseasiaprod/production-adb-public/0527161069ff4d36b2d97899d0668d99

Can, B. (2024b). *Cash Forecasting for Treasury Cash Management in Türkiye.* Presented at the PEMPAL TCOP Thematic Meeting on Strengthening and Measuring Treasury Performance in Cash Management and Forecasting, November 6, Tirana, Albania. Available at: https://www.pempal.org/events/pempal-tcop-thematic-meeting

Cangoz, M. C. & Secunho, L. (2020). *Cash Management: How Do Countries Perform Sound Practices?* Equitable Growth, Finance and Institutions Insight. Washington, DC: World Bank. Available at: http://hdl.handle.net/10986/34674

Çınar, S., Anavatan, A. & Deyneli, F. (2022). Testing Effects of the Treasury single account system on the cost of borrowing in the OECD Countries. *Journal of Economics and Finance* 46, pp.757–770. Available at: https://doi.org/10.1007/s12197-022-09584-w

PEMPAL (2021). *Government Treasury Single Account and Cash Management in PEMPAL Countries.* PEMPAL TCOP Thematic Survey. Available at: https://www.pempal.org/sites/pempal/files/2021_tsa_and_cm_in_pempal_countries_eng.pdf

PEMPAL (2025). *Measuring Treasury Performance in PEMPAL Countries*. Thematic Survey Results. PEMPAL Treasury Community of Practice. Available at: https://www.pempal.org/knowledge-product/measuring-treasury-performancepempal-countries-thematic-survey-results

Silins, M. (2024) *Optimal Coverage of the Treasury Single Account.* PEMPAL TCOP knowledge product. Available at: https://www.pempal.org/knowledge-product/optimal-coverage-treasury-single-account

Utz, R. J., Mastruzzi, M., Vazquez A. F. & Tawfik, E. A. S. (2022). An overview of the potential impact of the Covid-19 crisis on the accumulation of government expenditure arrears. *Equitable Growth, Finance and Institutions Insight Washington, D.C.*, World Bank Group. Available at: http://documents.worldbank.org/curated/en/673331610536300640

Varea, M., & Arosteguiberry, A. (2016). Chapter 2. Treasury Management Efficiency Indicators. In: *Public Financial Management in Latin America*. USA: Inter-American Development Bank. Available at: https://doi.org/10.5089/9781597822268.071.ch002

Williams, M. (2024) *Key Performance Indicators (KPIs) for Cash Management: Design, Challenges & Examples.* Presented at the TCOP Thematic Meeting in Tirana, November 2024. Available at: https://www.pempal.org/sites/pempal/files/event/2024/Treasury%20COP%20Events/Nov04_Tirana%2C%20Albania/files/1_kpis_cash_mngt_mike_williams_eng_0.pdf