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Effectiveness and Efficiency of Polish Revenue Administration after the 2017 Reform in the Context of Tax Process Digitalisation

Abstract:

This article examines whether the 2017 reform establishing the National Revenue Administration (Polish: Krajowa Administracja Skarbowa, abbreviated KAS) and tax process digitalisation improved both collection effectiveness and operational efficiency. The study covers the years 2017–2024 and draws on data from the Ministry of Finance, the Supreme Audit Office, the European Commission, and the OECD. Two research hypotheses were tested. Hypothesis H1 assumed that KAS digitalisation increased VAT collection effectiveness but had an asymmetric impact on the tax system. It neither reduced the CIT gap proportionally nor significantly improved operational efficiency. Hypothesis H2 proposed that digitalisation transformed the KAS supervision model from traditional

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on-site controls to algorithm-driven verification procedures, encompassing both automated checks and manual verification activities guided by risk profiling.

Both hypotheses were confirmed. VAT collection effectiveness improved markedly: the VAT gap decreased from 24.1% to 6.9% and the VAT Revenue Ratio (*VRR*) increased from 35% to 46%. The CIT gap fell to 33%, while the CIT-Revenue Ratio (*CIT-RR*) rose only to 18%. The supervision model transformed substantially: traditional controls declined by 59.6%, while verification proceedings increased by 143%. The accuracy rate for selection into audits reached as high as 99.2%. Paradoxically, operational efficiency did not improve: collection costs oscillated around 1.8–2.0 PLN/100 PLN of revenue in recent years, and average proceedings time increased. The article identifies three priorities for further reform: tax regulation stabilisation, investment in human resources, and enhanced monitoring of international profit transfers.

Keywords: tax system, fiscal authority reform, effectiveness and efficiency, tax gap, digitalisation

JEL: H20, H26, H62, H83, O38

1. Introduction

Tax administration is fundamental to state financial stability, fiscal policy implementation, and shaping citizen-state relations. Collection effectiveness and operational efficiency directly affect government revenues and public trust in fiscal institutions. In this article, collection effectiveness is understood as the capacity to maximise tax revenues. Operational efficiency is conceived as resource optimisation, specifically the management of costs, processing time, and the structure of tax supervision. The 2017 reform was crucial. It established the National Revenue Administration (Polish: *Krajowa Administracja Skarbowa*, abbreviated *KAS*), consolidated structures, integrated services, and implemented digital and analytical tools. This article examines whether these changes improved collection effectiveness and operational efficiency. While the literature on VAT gaps, tax administration reform, and digital enforcement tools has expanded rapidly in recent years, studies that integrate fiscal outcomes, operational efficiency, and supervision model transformation in the Polish tax administration after the 2017 reform remain limited.

The analysis is guided by two research questions:

1. Did *KAS* digitalisation have an asymmetric impact on VAT and CIT collection effectiveness?
2. Did it transform the *KAS* supervision model from traditional audits to algorithm-driven verification procedures?

Two research hypotheses were formulated:

H1: KAS digitalisation increased VAT collection effectiveness but had an asymmetric impact on the tax system. It neither reduced the CIT gap proportionally nor produced significant improvement in operational efficiency.

H2: Tax process digitalisation during the 2017–2024 period transformed the KAS supervision model. Traditional, discretionary controls were gradually displaced by automated processes based on risk profiling algorithms.

Verification of both hypotheses required distinguishing between two dimensions of the KAS reform: fiscal changes contingent on institutional, macroeconomic, and structural factors (H1), and supervision model transformation, which is a direct effect of implemented digital tools independent of economic conditions (H2). A detailed explanation of testing mechanisms for each hypothesis is contained in the Methodology section.

The article is structured as follows. After presenting the methodology, the concepts of effectiveness and efficiency in tax administration are described from a theoretical perspective. Subsequently, the 2017 tax administration reform and tax process digitalisation are discussed. The final section contains conclusions and recommendations based on identified trends.

2. Methodology

The study is based on secondary empirical data obtained from reports of the Ministry of Finance, the Supreme Audit Office, the European Commission, and the OECD. The comparative analysis encompasses two time periods: the pre-reform period (2015–2016) and the post-reform and digitalisation period (2017–2024). Benchmarking against Estonia and Finland serves to verify whether Poland fits the modern, European digitalisation trend.

Hypothesis H1 tests the assumption that tax administration digitalisation has an asymmetric impact on various dimensions of the tax system. This asymmetry stems from the different operating mechanisms of individual taxes and administrative areas.

For VAT, digital tools enable high-level verification of business-to-business transactions. These tools include JPK VAT, STIR, and split payment mechanisms. This analysis examines whether application of these tools affected the VAT Revenue Ratio (*VRR*) and the VAT gap. The VAT gap is calculated as the difference between potential revenue and actual collection, expressed as 100% minus *VRR*. An increase in *VRR* and a decrease in the VAT gap would evidence that digital tools genuinely increase VAT collection effectiveness.

For CIT, the situation is markedly different. The CIT gap is primarily associated with international transfers and profit shifting abroad through transfer pricing and intellectual property rights relocation. This analysis examines whether, despite digitalisation, the CIT gap changes less dynamically than the VAT gap. The CIT gap is calculated as 100% minus the CIT Revenue Ratio (*CIT-RR*). If the CIT gap declines more slowly than the VAT gap, this provides evidence that digitalisation alone is insufficient to address CIT challenges.

The third focus area concerns operational efficiency within tax administration. Digitalisation may have increased the volume of verification proceedings, encompassing both manual and automated checking activities. However, genuine operational efficiency gains would be reflected in lowered actual tax collection costs and reduced processing times. This analysis evaluates whether reductions in the VAT gap were accompanied by proportional declines in collection costs, expressed in Polish zloty per 100 zlotys of revenue, and in average processing time, as an indicator of operational efficiency gains.

Hypothesis H2 tests the assumption that tax administration reform and digitalisation transformed the KAS supervision model. There has been a shift from traditional typology-based controls to automated verification processes, where algorithms select taxpayers based on risk profiles.

The first indicator of this transformation is a change in supervision volume. The study examines whether the number of traditional audits decreased while the number of verification proceedings increased. The second focus is supervision effectiveness, assessed by the proportion of controls detecting irregularities. Risk profiling algorithms are increasingly used to guide taxpayer selection, though the extent of full automation versus manual review remains unclear. Thirdly, the analysis assesses the quality of individual administrative decisions by tracking changes in the rate of decisions overturned in court. A high overturn rate may suggest that while the targeting of taxpayers for control has become more precise, decisions themselves are subject to legal challenge, pointing to regulatory ambiguities or administrative errors.

Summarising, H2 verifies whether all three transformation dimensions occur simultaneously: change in supervision structure, increased tax enforcement effectiveness, and change in individual decision selection and evaluation. Convergence of all three dimensions would indicate genuine transformation of the KAS supervision model. This phenomenon reflects the complexity of transformation: increased control volume coincides with increased court disputes.

The analysis focuses on trends and structural changes in supervision rather than achievement of rigid criteria. Due to unavailable monthly data that would enable seasonality analysis and precise isolation of reform effects from other macroeconomic factors, and incomplete availability of comparative CIT data, the study measures dynamics of change rather than absolute indicators.

The study intentionally applies simple and transparent analytical indicators instead of complex econometric models. This approach reflects data availability constraints and the need to ensure long-term comparability of results across the post-reform period. The objective is to identify structural trends and directional changes in tax administration performance rather than to estimate causal effects using advanced econometric techniques.

3. Effectiveness and Efficiency in Tax Administration – Theoretical Framework

The concepts of effectiveness and efficiency in tax administration have a wide interpretive spectrum and are defined differently depending on the research perspective – economic, legal, administrative, or managerial (Sułkowski, Wolniak, 2013:64).

Within the New Public Management (NPM) framework, public administration performance is evaluated through results orientation, cost discipline, and measurable outputs (Hood, 1991). However, subsequent research has questioned the direct transferability of these assumptions to tax administration, particularly in digitalised enforcement environments where higher effectiveness does not necessarily translate into lower administrative burden.

Behavioural research shows that such enforcement must be balanced with taxpayers' trust and tax morale to sustain compliance in the long run (Alm, Torgler, 2011:640–642). In evaluating KAS, it is necessary to distinguish between outcome and process metrics, assessing their combined institutional effect. Collection effectiveness is the capacity to maximise tax revenues, which can be assessed by comparing statutory and actual tax rates: the smaller the divergence, the higher the level of fiscal goal achievement. The metrics for effectiveness are as follows. For VAT, the primary metric is the *VRR*, for CIT, it is the *CIT-RR*. Their high level indicates the effectiveness of the tax apparatus in collecting a specific tax. A second, related metric is the tax gap, the difference between tax legally owed and tax actually collected. The CIT gap, though harder to estimate than the VAT gap, is a significant metric of administration's capacity to enforce obligations toward large business entities.

Efficiency, viewed more broadly, need not be understood solely as minimisation of administrative costs, but as resource allocation optimisation such that maximum fiscal and organisational results are achieved at a rational spending level. It includes implementation of innovative digital tools, better human capital management, and improved analytical and control processes (TADAT, 2019; IMF, 2022:11; OECD, 2023). OECD tax administration reports, including Tax Administration 2015 and Tax Administration 2021, regularly use cost-of-collection (cost-to-revenue) ratios as core efficiency indicators and various compliance and tax gap measures as key metrics of effectiveness (OECD, 2015; 2021). At the same time, empirical studies report mixed results regarding the efficiency effects of digitalisation: while detection capacity and revenue outcomes often improve, administrative workload, dispute resolution costs, and data processing complexity may increase rather than decrease.

In the Polish literature, the efficiency of tax services is additionally associated with institutional stability, adequately prepared staff and respect for taxpayers' rights, rather than with cost minimisation alone (Kosińska, Ruśkowski, Woltanowski, 2016:17–19). Supervision is conceived as a key instrument that supports internal control and helps ensure the effective and efficient achievement of organisational goals in tax administration units (Ucieszyńska, 2018:415–418).

In this context, tax administration efficiency refers to the relationship between fiscal outcomes and the resources required to achieve them, commonly expressed through collection costs and processing time (Wyrzykowski, Kasprzak, 2017). It also encompasses organisational capacity to perform statutory functions without reducing service quality for taxpayers (Dziemianowicz, Przygodzka, 2007; Filipczyk, 2022).

The concepts of effectiveness and efficiency in tax administration are basic analytical categories in public finance sciences and public sector management. Though often used interchangeably, their meanings are distinct and complementary. In the context of KAS reform, the paradox between increased collection effectiveness and absence of operational efficiency growth is a key issue. If digitalisation increased *VRR* but collection costs remained stable or rose, it suggests that new tools did not eliminate operational costs but merely shifted them to other areas, such as analytics and court dispute management. This trade-off between effectiveness gains and uncertain efficiency effects forms the analytical background for the empirical verification conducted in this study.

Critically, Polish cases reveal HR bottlenecks (Sarnowski, 2023), absent in Estonia's full e-invoicing success (Reitmann, 2021), underscoring digitalisation's limits without institutional stability.

4. Tax Administration Reform

Before the KAS was established, the tax and revenue administration was characterised by systemic inability to act effectively and efficiently. This was underscored by international organisations – the OECD, the IMF, and consulting firms (PwC, 2013; KPMG, 2015; OECD, 2015). They emphasised the high and growing level of VAT and CIT tax gaps and low efficiency in most analysed areas. They pointed to high tax collection costs – 1.6% of total tax revenue, the worst result in Europe.

In 2015, the IMF prepared a report at the Ministry of Finance's request to analyse weaknesses in tax administration performance. The report found that achieving better performance metrics depended largely on modernising the tax administration and identified characteristics of modern tax administration (Toro et al., 2015).

The tax administration reform, which resulted in the establishment of the National Revenue Administration (KAS), took effect on 1 March, 2017, and was one of the most comprehensive reorganisation projects in Polish tax administration history (Journal of Laws of the Republic of Poland 2016, item 1947). The main objective was to integrate three previously separate structures: the tax administration, tax control service, and customs service into one coherent fiscal management system. Actions were systemic in nature and covered organisational, legislative, technological, and human resource changes. The bill's justification stated that the previous model was dispersed, ineffective, and ill-suited to modern economic challenges, including rising tax fraud and the need for public service digitalisation (Sejm, 2016: print 826, 925).

The reform aimed to increase tax collection effectiveness, improve operational efficiency, simplify organisational structure, and strengthen control over goods and services flows in domestic and international trade.

The law integrated the tax administration, tax control service, and customs service into one structure, supported by new analytical units (KAS, 2018). Organisational improvements and analytical tool strengthening occurred, but simultaneously limitations arising from the human resource factor emerged. Fiscal effectiveness does not correlate with sustained operational efficiency growth if administration faces staff turnover and low employee motivation problems (Sarnowski, 2023:20).

The reform, as adopted, faced criticism from expert circles, business organisations, and private sector representatives. Many believed the reform was implemented too quickly, without an adequate transition period and social consultation. Concerns were raised about a lack of precise implementing regulations, unclear competencies between new units, and risk of overloading administrative staff. Some researchers noted that the KAS reform focused primarily on organisational aspects, overlooking the need for deeper institutional culture reform and taxpayer relationships (Adamski, 2016; Kulicki, 2016; *Irena Ożóg...*, 2017).

In Estonia, a leader in public service digitalisation, reform was closely linked to implementing advanced IT solutions and building public trust in fiscal institutions (Reitmann, 2021). The KAS reform exemplifies structural modernisation with a strong technological component but a limited influence on organisational culture. The KAS reform and tax process digitalisation provide a natural laboratory to test whether deep institutional changes translated into genuine improvement in collection effectiveness and operational efficiency.

5. Implementation of Tax Process Digitalisation

Digital tools and analytical systems were rolled out to streamline communication with taxpayers and boost tax control effectiveness. Before the KAS was formally established, the foundation was already being laid in 2016 with pilot implementations. These early steps proved instrumental in driving both effectiveness and efficiency gains once the KAS came online.

The cornerstone was the JPK VAT (Standard Audit File for VAT) system, launched on 1 July, 2016. This monthly reporting mechanism, capturing business transaction data and submitted directly to tax offices, created unprecedented opportunities for cross-checking across the supply chain (Journal of Laws of the Republic of Poland 2018, item 2174). Simultaneously, CIT enforcement was strengthened through two complementary rules: the GAAR (General Anti-Avoidance Rule) and the SAAR (Specific Anti-Abuse Rules), both designed to counter sophisticated tax avoidance schemes (Journal of Laws of the Republic of Poland 2025, item 111). However, as A. Olesińska notes, these CIT provisions did not always align with business realities, and their application carried inherent interpretive risks (Olesińska, 2016:315).

Table 1 outlines the major digitalisation milestones implemented following the KAS's establishment.

Table 1. Major digitalisation milestones implemented following the KAS's establishment

Year	Tools
2018	STIR (Automatic Tax Fraud Detection Systems)
2018	Split Payment
2019	e-PIT
2019	MDR (Mandatory Disclosure Rules)
2019–2020	Development of predictive analytics at KAS
2023	KSeF (National e-Invoicing System), mandatory from 2026
2024	Preparation for ViDA (VAT in the Digital Age) – planned entry into force in 2028
2025	JPK CIT (Standard Audit File for CIT)

Source: own elaboration based on information from the Ministerstwo Finansów, 2025b.

Parallel to formal implementation came ongoing refinement and interpretation of these tools. Some challenges stemmed from gradual rollout; others reflected design flaws or misaligned priorities. Regardless, the transition itself imposed costs: legal instability, variable interpretation, and system implementation expenses all created friction.

The level of KAS digitalisation as a factor affecting increased control effectiveness and efficiency is significant. However, as N.E. Mitu emphasises, taxpayer compliance levels are influenced not only by fiscal instruments. They are also influenced by social and psychological factors. These factors include tax morale, perception of system justice, and institutional trust (Mitu, 2016:80). Consequently, digitalisation alone, while increasing control effectiveness, need not automatically increase taxpayer acceptance and legal compliance levels.

One key effect of digitalisation is change in the tax supervision structure. During the 2018–2024 period, the number of traditional tax audits fell from 23,000 to 9,300. This represents a 59.6% decline. Verification procedures increased from 986,000 to 2.39 million. This represents a 143% increase. The KAS increasingly utilises automated verification forms based on risk analysis and data processing. These tools include JPK VAT and STIR. However, the reduction in audit quantity is also linked to staff shortages.

The ratio of traditional audits to verification procedures has changed dynamically. In 2018, it was 1:43. By 2024, it became 1:258. This shows that modern tax administration increasingly focuses on precise, digital verification forms rather than time-consuming on-site audits. Simultaneously, control selection effectiveness increased. It rose from 85.8% in 2020 to 99.2% in the first half of 2025. This may indicate that KAS conducts audits almost exclusively in cases where irregularities are already suspected.

This model reflects a European digitalisation trend. Reduction of traditional audits approximates 60%, replaced by a rise in verification proceedings, which include both manual and automated activities. However, a change in supervision structure does not necessarily imply an improvement in operational efficiency if the costs of managing the new verification methods remain high.

6. Research Findings – An Analysis of Effectiveness and Efficiency Indicators

The VAT gap is the difference between expected tax revenue and actual income. It results from prohibited acts: tax fraud, tax evasion, administrative errors, or business insolvency (Lachowicz, 2021: 7). It is an effectiveness metric. The lower the VAT gap, the more effective the tax collection system. Table 2 presents the VAT gap level in Poland in the years 2015–2024.

Table 2. VAT gap level in Poland in the years 2015–2024 (%)

Year	VAT gap (%)	Comments
2015	24.1	Intensive tax sealing activities begin.
2016	19.9	Start of the so-called fuel package.
2017	15.3	Effects of the JPK VAT.
2018	14.2	Extension of VAT control and STIR.
2019	13.9	
2020	11.6	SarsCov-2, a decline in economic activity.
2021	5.6	A consequence of the reforms so far. Change in the counting method.
2022	8.4	Widening of the VAT gap – the effect of anti-inflation shields.
2023	13.5	Expiration of VAT preferences (Ministerstwo Finansów, 2025a).
2024	6.9	Decline after the reforms and KAS digitalisation. (Pogroszewska, 2025).

Source: own elaboration based on: European Commission, CASE, 2022:111; 2025b: 5.

The largest VAT gap decrease occurred in the years 2017–2021. The gap fell from 15.3% to 5.6%. This directly correlates with JPK VAT and STIR implementation. The 2022–2023 increase relates to phasing out COVID preferences, inflation, and economic structure changes (European Commission, CASE, 2022:111; 2025b: 5). The 2024 decline confirms long-term effectiveness of digital tools.

Poland achieved success in VAT gap reduction. Based on data in Table 2 and the verification thereof, a positive relationship exists between these achievements and specific KAS digitalisation elements. In 2022, Poland's VAT gap stood at 8.4% versus the EU average of 7%. Leaders: Estonia (4.5%) and Finland (3.5%) have the most advanced digitalisation. This enables better gap estimation. IMF research indicates strong correlation in Central and Eastern Europe. There is a strong link between tax administration strength and tax gap size. Countries with weaker institutions, such as Poland and Romania, face greater difficulties ensuring taxpayer duty fulfilment.

VRR measures VAT collection efficiency relative to theoretical fiscal potential. It accounts for the VAT gap, allowances, exemptions, and reduced VAT rates. Table 3 presents the VRR level relative to the EU average in selected years.

Table 3. The *VRR* level relative to the EU average in selected years (%)

	2015	2017	2019	2021	2022
Poland	35	42	44	50	46
EU average	43	45	46	48	52

Source: OECD, 2024: Table 2A.7.

The dynamic *VRR* increase in the years 2015–2021 reflects the KAS reform and digitalisation effects. The 2022 decline results from COVID preference phase-out and temporary anti-inflation shields which increased the policy tax gap. In 2015, Poland's *VRR* was estimated below 40% of potential VAT revenue relative to the tax base. Through presented tax reforms, *VRR* rose to 50% in 2021. It then began declining.

For several years, Poland's *VRR* has oscillated around the EU average. Leaders in efficiency are Estonia, Sweden, and Finland with ratios above 55%. This is owing to full e-invoicing and low VAT gap (OECD, 2024: Table 2A.7). Polish data indicate that a substantial portion of the VAT gap results from the policy gap. This is revenue loss from allowances, preferences, and reduced rates. As R. Piwowarski emphasises, the tax policy gap in Poland's VAT has exceeded 48% in recent years. This means the loss greater than the EU-28 average (Piwowarski, 2022:36–37).

CIT is the third largest tax revenue source. Similarly to the VAT gap, the CIT gap is the difference between theoretical income from this tax and actual revenue. It comprises two components: the compliance gap and the policy gap. The compliance gap results from tax evasion, errors, and fraud. The policy gap results from allowances, exemptions, and statutory preferences.

The EU CIT gap is estimated at 3–40% of potential income. A lack of standardised data complicates comparisons (European Commission, CASE, 2025a: 92). In Poland, the gap was calculated by the Polish Economic Institute (PIE). The analysis covered the years 2014–2020. The highest level was recorded in 2014 (54%) and 2015 (50%). Since 2018, it approximates 33% (Polski Instytut Ekonomiczny, 2022: 7).

The CIT gap decline from approximately 50% to 33% in 2018 may result from improved collection. However, as the CIT gap remained broadly stable after 2018, the initial decline did not translate into a sustained structural improvement. It remains high due to structural tax administration limitations. Increased effectiveness does not always reduce tax evasion scope. As Milosavljević and co-authors demonstrated, this relationship is more complex. It depends on institutional quality and tax system stability (Milosavljević et al., 2024:10).

The *CIT-RR* rose from approximately 10% in 2015 to over 18% in 2023. This modest figure reflects structural impediments to effective CIT enforcement. The causes are analogous to those accounting for the CIT gap.

This asymmetry, effectiveness in VAT but no proportional CIT improvement, confirms H1 assumption of differentiated digitalisation impact on various taxes. VAT control effectiveness increases faster than CIT. This occurs owing to structural limitations: international profit transfers.

Chart 1 presents the costs of tax collection in Poland in the years 2015–2024.

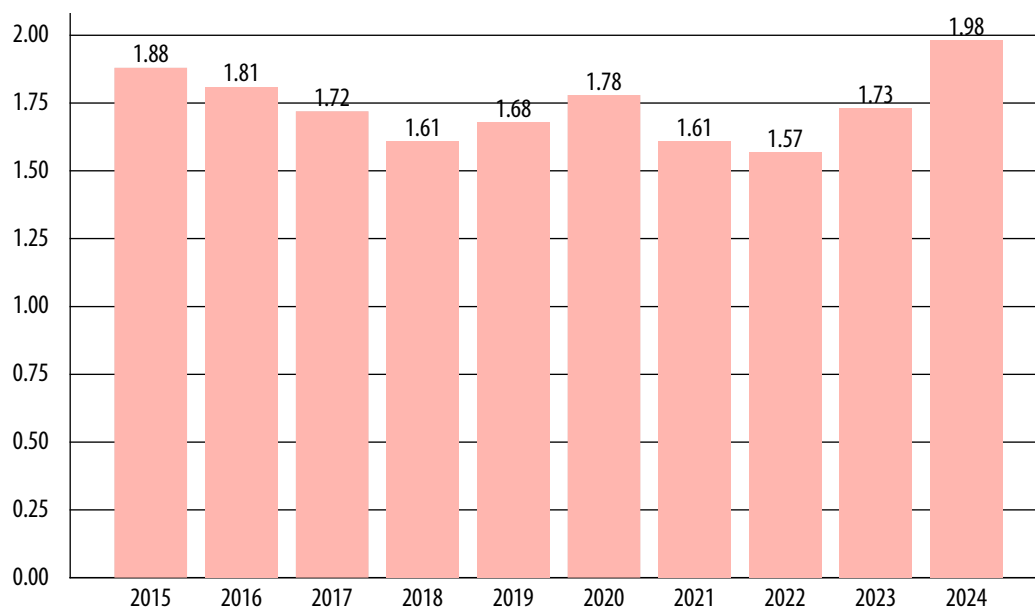


Chart 1. Cost of Tax Collection in Poland in the years 2015–2024 (PLN/100 PLN of tax revenue)

Source: own elaboration based on Ministerstwo Finansów, 2025a; NIK, n.d.

In the years 2015–2024, Poland maintained tax collection costs within 1.6–2.0% of tax revenue. Best results (1.57–1.61%) occurred in 2018, 2021, and 2022. These were effects of KAS consolidation and tax revenue increase. Worst results were recorded in 2015 (1.88%) and 2024 (1.98%). These were linked to sharp increases in digitalisation expenses and tax administration salaries. Poland remains above the OECD average (1.3–1.6%). This is partly for methodological reasons but also owing to high public tax apparatus modernisation costs.

Per OECD recommendation, this indicator has limited comparative value between countries. A varied policy impact, business cycle effects, or IT investments create measurement challenges. This leads to the conclusion that it should primarily serve trend monitoring within a single administration (OECD, 2023:134).

The final analysis element concerns an assessment of tax control effectiveness and quality of KAS administrative decisions. Data analysis indicates a non-uniform reform impact on tax administration functioning (NIK, 2022:15–24; 2024: part 3). Positive effects such as VAT gap decline and increased tax enforcement effectiveness are well-documented. Simultaneously, several operational and organisational limitations were revealed.

Processing delays are the most pressing concern. In regional tax offices, average case processing times grew from 126 to 140 days. Customs and tax control offices experienced an even sharper increase, from 328 to 371 days. Equally troubling is the 35% rate at which KAS decisions are overturned in court. This high reversal rate carries triple consequences: it strains administrative resources, delays taxpayer resolution, and erodes public confidence in system predictability and decision quality. As M. Jagodzińska has documented, declining enforcement effectiveness reflects KAS's resort to traditional, labour-intensive audit methods and its retreat from oversight of large enterprises (Miąsik, Sroczyński, 2024).

Compounding these challenges are stark regional disparities in office efficiency. These reflect both staffing constraints and inadequate tailoring of digital tools to local administrative contexts (Pokojska, 2021).

Yet the structural rebalancing is undeniable. Traditional audits contracted sharply from 23,000 (2018) to 9,300 (2024), a 59.6% reduction. Verification proceedings, encompassing both manual and automated checking activities, surged 143%. The audit to verification ratio shifted from 1:43 to 1:258. This transformation mirrors a global digitalisation trend: leading European systems (Estonia, Finland, Denmark) have achieved comparable or larger audit reductions (50–90%), replacing manual investigation with increasingly algorithm-driven risk screening.

6.1. Verification of Hypothesis H1

H1 has been confirmed. KAS digitalisation increased VAT collection effectiveness but had an asymmetric impact on the tax system. It neither reduced the CIT gap proportionally nor significantly improved operational efficiency.

The *VRR* indicator rose from 35% in 2015 to 46% in 2022 (an increase of 11 p.p.). The VAT gap declined from 24.1% to 6.9% (a reduction of 17.2 p.p.). These data indicate substantial improvement in VAT collection effectiveness during the digitalisation period. The *VRR* increase can be attributed to implementation of digital tools (JPK VAT, STIR, and split payment), which enabled precise verification of business-to-business transactions. The *CIT-RR* rose by 8 percentage points to 18.3%, and the CIT gap decreased from 50% to 33%. Consequently, the CIT gap remained more than several times higher than the VAT gap (33% vs. 6.9%). This asymmetry indicates that digitalisation, while strengthening VAT collection effectiveness, did not resolve fundamental problems in CIT enforcement, which require more advanced tools beyond digitalisation itself. This analysis enriches the discussion on the KAS reform, highlighting structural differences in VAT and CIT collection overlooked in prior OECD and EU reports.

Collection costs oscillated between 1.7–2.0 PLN per 100 PLN of revenues, meaning no significant decline occurred despite increased VAT effectiveness. Average processing time increased from 126 days to 140 days. These indicators show that despite gains in collection effectiveness, administrative operational expenses did not decline proportionally, signifying the absence of substantial improvement in operational efficiency.

6.2. Verification of Hypothesis H2

H2 has been confirmed. Tax process digitalisation transformed the KAS supervision model. The shift from traditional audits to automated risk profiling-based verification proceedings has occurred.

The number of traditional audits declined by 59.6% (from 23,000 in 2018 to 9,300 in 2024). Simultaneously, the number of verification proceedings increased by 143% (from 0.99 million to 2.4 million). The ratio of traditional audits to verification proceedings changed from 1:43 (2018) to 1:258 (2024). This transformation in supervision structure results from digitalisation; however, staffing shortages also contributed to this shift.

Audit selection accuracy increased from 85.8% (2020) to 99.2% (first half of 2025), indicating that taxpayer selection for audits became more precise, partly owing to the application of automated algorithms. Simultaneously, the high rate of overturned decisions (35% in administrative courts) reveals the complexity of this transformation: the increased precision of algorithms in taxpayer selection did not translate into improved accuracy of individual tax decisions.

7. Discussion

The discussion centres on explaining the observed duality between increased fiscal effectiveness and a lack of proportional improvement in operational efficiency. However, it is important to note that the significant decline in the VAT gap (from 24.1% in 2015 to 5.6% in 2021) was influenced not only by KAS digitalisation but also by tools introduced before the KAS was established: JPK VAT and the fuel package. The gap increase in 2022–2023 resulted from anti-inflation shields and the phasing out of COVID preferences, not from administration weakness. Therefore, attributing all positive effects solely to KAS digitalisation requires methodological caution. The VAT gap decline resulted from earlier legislative reforms as much as from KAS digitalisation.

The observed asymmetry in results with high effectiveness in VAT (gap of 6.9%) compared to significantly lower effectiveness in CIT (gap of 33%) directly confirms H1's assumption. Digitalisation tools (JPK VAT, STIR, and split payment) are highly effective in controlling B2B transactions, which are transparent and verifiable. However, international profit transfers, which constitute the majority of the CIT gap, require ongoing monitoring of international data, advanced econometric modelling, and international cooperation that lies beyond the direct control of Polish administration. In this sense, the asymmetry results from the different characteristics of these taxes, not from limitations of digitalisation itself.

Staffing problems, such as high employee turnover and low motivation levels in tax administration, limit the potential for achieving full operational efficiency. Moreover, complications arising from tax law instability and variable interpretation of regulations increase the number of audits and high rate of overturned decisions, which diminishes the predictability of the tax system.

Poland's challenge is therefore to combine further digitalisation with building a stable legislative environment and developing employee competencies to minimise unpredictability and interpretive conflicts.

The results of this study open directions for further research.

8. Do employee training programmes concerning the KAS reduce the rate of overturned decisions? If so, is the correlation statistically significant?

1. Is the main barrier to CIT gap reduction the application of transfer pricing or insufficient digitalisation in the field of audits of international entities?
2. Does the level of tax system predictability, measured by the rate of overturned decisions, influence voluntary taxpayer compliance?
3. Has administration digitalisation reduced operational costs, or merely shifted them to other areas?

9. Conclusions

The conducted research confirms that the KAS reform and tax process digitalisation from the 2017–2024 period have yielded measurable benefits, and both hypotheses have been confirmed. The analyses indicate a trade-off between fiscal effectiveness and operational efficiency, where intensification of controls and digitalisation increase revenues but also increase staffing burden and lengthen tax proceedings. This indicates a need for proportional investments in infrastructure and human resources.

The direction of transformation of Polish tax administration aligns with OECD international standards and EU member state practice, confirming the validity of the chosen reform strategy. The results indicate three areas that should be priorities for improvement:

- Tax regulation stabilisation – to reduce the number of overturned decisions and increase systemic predictability,
- Human resource management – reducing employee turnover and investing in training,
- Monitoring of international profit transfers.

It is highly desirable to implement advanced technologies beyond the current digitalisation efforts. New quality can be brought by blockchain-based solutions, which hold significant potential in improving transparency, security, and efficiency of tax collection (Kim, 2022; Mazur, 2022). Blockchain solutions can be particularly useful for monitoring international transfers and real-time control in supply chains. However, their implementation first requires stabilisation of the legislative environment and resolution of staffing problems identified in this analysis.

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Skuteczność i efektywność polskiej administracji skarbowej po reformie 2017 roku w kontekście cyfryzacji procesów podatkowych

Streszczenie:

Artykuł analizuje, czy reforma z 2017 roku, powołująca Krajową Administrację Skarbową (KAS), i cyfryzacja procesów podatkowych poprawiły skuteczność poboru i efektywność operacyjną administracji skarbowej. Badanie obejmuje lata 2017–2024 i opiera się na danych Ministerstwa Finansów, NIK, Komisji Europejskiej oraz OECD. Zweryfikowano dwie hipotezy badawcze. Hipoteza H1 zakładała, że cyfryzacja KAS zwiększyła skuteczność poboru VAT, jednak miała asymetryczny wpływ na system podatkowy, nie doprowadzając do proporcjonalnego zmniejszenia luki CIT ani do istotnej poprawy efektywności operacyjnej. Hipoteza H2 stwierdzała, że cyfryzacja procesów podatkowych przekształciła model nadzoru KAS, zastępując kontrole tradycyjne weryfikacjami kierowanymi algorytmami profilu ryzyka, obejmującymi zarówno automatyczne sprawdzenia, jak i docelowe czynności sprawdzające. Obie hipotezy potwierdzono. Skuteczność poboru VAT wzrosła istotnie: luka spadła z 24,1% do 6,9%, wskaźnik *VRR* wzrósł z 35% do 46%. Luka CIT spadła do 33%, wskaźnik *CIT-RR* wzrósł zaledwie do 18%. Model nadzoru zmienił się: kontrole tradycyjne spadły o 59,6%, czynności sprawdzające wzrosły o 143%. Precyzja typowania do kontroli wzrosła do poziomu 99,2%. Paradoksalnie efektywność operacyjna nie poprawiła się – koszty poboru kształtowały się w przedziale (1,7–2,0 zł/100 zł), czas postępowania

się wydłużył. Artykuł wskazuje trzy priorytety dla dalszych reform: stabilizację regulacji podatkowej, inwestycje w zasoby ludzkie oraz powiększenie zdolności do monitorowania transferów zysków międzynarodowych.

Słowa kluczowe: system podatkowy, reforma KAS, skuteczność i efektywność, luka podatkowa, cyfryzacja