When enforcement goes digital: Balancing revenue and compliance costs

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- **Digital compliance measures can increase VAT revenue significantly.** E-invoicing and e-reporting systems increase reported VAT by 5-48%, with most estimates clustering around 10-30%.
- **Compliance costs are large and highly regressive, threatening small business viability.** Small firms spend over 100% of VAT remitted on compliance, while large firms spend only 15-20%. This regressivity risks pushing small businesses toward informality.
- **Net welfare impacts depend critically on firm size and implementation design.** When accounting for heterogeneous compliance costs, the net welfare impact is negative other than for the largest 20% of firms.
- **Developing countries need tailored strategies, not technological transplants.** Success requires adequate digital infrastructure, administrative capacity, and support systems. Phased implementation with size-based thresholds and simplified regimes for small firms is essential.

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Digital compliance measures in VAT systems, such as e-invoicing and electronic fiscal devices, can increase tax revenue substantially but impose highly regressive compliance costs that threaten to undermine their benefits, particularly for developing countries.

The past decade has witnessed a fundamental shift in how governments enforce value-added tax (VAT). More than 40 countries have abandoned simple, aggregate-based reporting in favour of comprehensive digital systems requiring transaction-level reporting, frequently in real time. While these measures promise to strengthen enforcement and boost revenue, emerging evidence reveals a critical trade-off: the compliance costs are not only substantial but also highly regressive, placing disproportionate burdens on small firms.

This brief synthesizes evidence from recent implementations across both advanced and developing economies. Drawing on firm surveys from Pakistan, World Bank compliance cost studies, and revenue impact assessments from Peru, Rwanda, Ethiopia, and other countries, we document both the promise and pitfalls of digital compliance measures. The findings carry urgent implications for policymakers contemplating these technologies.

Digital compliance measures can increase VAT revenue significantly

The empirical evidence on revenue impacts is compelling. Studies across diverse contexts show that digital compliance measures significantly increase tax collection.

- **Peru**: E-invoicing increased reported sales, purchases, and value-added by 5% in the first year, growing to 10-15% by year four (Bellon et al., 2022)
- **Rwanda**: While E-invoicing itself did not have much impact, its combination with audits increased VAT payments substantially (Kotsogiannis et al., 2025)
- **Ethiopia**: Electronic sales registration machines generated a 48% rise in VAT revenue (Mascagni et al., 2021)
- **Pakistan**: E-reporting led to nearly 30% increase in VAT remittances (Ahmed et al., 2025)

These gains reflect the power of third-party information to reduce evasion. Digital systems enable automatic cross-checking of transactions, making unilateral evasion – where one party to the transaction reports while the other does not – immediately detectable. However, they remain vulnerable to collusive evasion and more sophisticated schemes, such as missing trader frauds.

Importantly, effectiveness varies considerably by context. Electronic fiscal devices (EFDs) in East Africa showed mixed results, with Kenya seeing no sustained revenue increase despite widespread adoption. Success appears contingent on complementary enforcement efforts and institutional capacity.

Compliance costs are large and highly regressive, threatening small business viability

While revenue gains capture headlines, the distribution of compliance costs tells a more troubling story. Evidence from three sources reveals a consistent pattern: modern tax systems impose dramatically higher burdens on smaller firms.

Ahmed et al. (2025) provide the most direct evidence, surveying Pakistani firms about the marginal costs of e-reporting, a popular digital compliance measure. Their findings are stark:

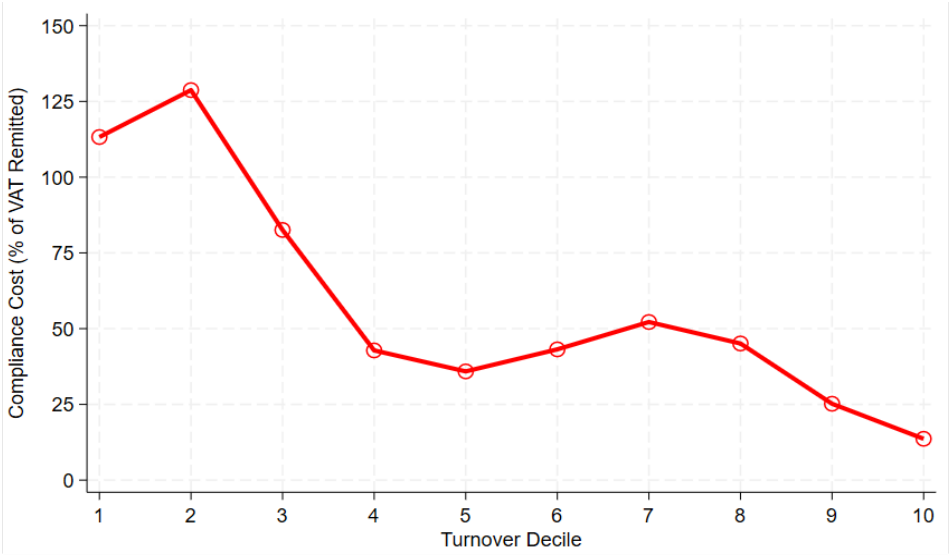
- Smallest firms: compliance costs exceed 100% of VAT remitted
- Medium firms: costs range between 40-80% of VAT
- Largest firms: costs below 20% of VAT

Crucially, over three-quarters of these costs stem directly from digital compliance requirements, not general VAT administration.

This pattern appears globally. World Bank surveys across developing countries and European Commission studies both document similar regressivity. In some EU countries, such as Italy and Czechia, compliance costs for micro-enterprises exceed their entire VAT liability.

The implications are profound. Since 80% of VAT revenue typically comes from the largest 20% of firms (Brockmeyer et al., 2024), aggregate statistics mask the burden on small businesses. A "successful" implementation that increases overall revenue may simultaneously drive smaller firms toward informality or closure.

Figure 1. Compliance costs of e-reporting by firm size: evidence from Pakistan



Source: Ahmed et al., (2025).

Net welfare impacts depend critically on firm size and implementation design

The welfare implications of digital compliance measures cannot be assessed through revenue impacts alone. Using the framework of Keen & Slemrod (2017), we must weigh the social value of additional revenue against both administrative and compliance costs.

Assuming a marginal value of public funds of 1.5 (following Cellini et al., 2010), a 24% revenue increase translates to approximately 12% welfare gain. Administrative costs, typically around 1% of revenue collected, reduce this marginally.

However, incorporating heterogeneous compliance costs fundamentally changes the calculation. For firms in the bottom 80% of the size distribution, compliance costs often exceed any plausible welfare gains from increased revenue. Only for the largest firms, which face relatively low compliance costs and generate most VAT revenue, is this net welfare impact positive. When aggregating across all firms, the disproportionate burdens on numerous small firms thus may outweigh the net social gains from enhanced revenue collection, potentially making the total welfare impact ambiguous despite substantial revenue increases.

This heterogeneity explains why aggregate assessments miss crucial distributional impacts. A measure that appears welfare-enhancing on average may harm the majority of firms while benefiting only a concentrated few.

The challenge for policymakers is designing systems that capture revenue gains while mitigating regressive impacts. This requires moving beyond one-size-fits-all approaches towards differentiated implementation strategies.

Table 1. Welfare impacts of e-reporting by firm size

Firm size	Revenue gain (% of VAT)	Compliance cost (% of VAT)	Net welfare impact
Bottom 20%	24%	>100%	Negative
Quintile 4	24%	20-40%	Marginal
Top 20%	24%	<20%	Positive

Source: Ahmed et. al., (2025).

Developing countries need tailored strategies, not technological transplants

The evidence reveals a fundamental challenge for developing countries: while digital compliance measures offer powerful enforcement tools, their regressive cost structure threatens to undermine broader development objectives. Key prerequisites for successful implementation include:

Infrastructure readiness

- Reliable internet covering 70%+ of businesses
- Basic digital literacy among tax officials and firms
- Legal frameworks for electronic transactions

Administrative capacity

- Systems to distinguish errors from evasion
- Risk-based audit capabilities
- Taxpayer support services

Design features for equity

- High initial thresholds exempting small firms
- Simplified regimes below thresholds
- Grace periods without penalties

- Government-provided software and training.

Countries lacking these foundations should focus on building basic capacity rather than pursuing sophisticated digital systems. The failure of some EFD implementations in Africa, despite high adoption rates, illustrates the risks of premature technological adoption.

Regional cooperation can reduce costs and improve outcomes. Shared platforms, common standards, and pooled technical assistance offer economies of scale while ensuring solutions fit developing country contexts.

Policy recommendations

1. **Implement graduated thresholds with progressive expansion**
   Begin with high turnover thresholds capturing only the largest firms (70-80% of revenue) and lower gradually over 3-5 years as capacity builds.
2. **Create dual-track systems with simplified options for small firms**
   Allow smaller businesses to report quarterly aggregates rather than transaction-level detail, maintaining oversight while reducing burdens.
3. **Provide government-funded digital infrastructure**
   Offer free or subsidised e-invoicing software, APIs, and mobile solutions, recognising that reducing private compliance costs is a public good.
4. **Invest heavily in taxpayer support before enforcement**
   Establish multilingual help desks, training programs, and 12-18 month grace periods. The cost of support is minimal compared to compliance burden reduction.
5. **Conduct realistic capacity assessments before adoption**
   Evaluate technological infrastructure, administrative capabilities, and business readiness. Countries lacking prerequisites should focus on foundational improvements.
6. **Design for simplification, not just enforcement**
   Use transaction data to pre-populate returns and offer simplified filing for compliant taxpayers, transforming burdensome requirements into assistance.
7. **Enable regional cooperation and knowledge sharing**
   Develop common standards and shared platforms within economic communities to reduce costs and facilitate cross-border trade.
8. **Prioritise research on distributional impacts**
   Study elasticity of formalisation, optimal sequencing, and cost-effective support systems to inform evidence-based design.

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