

When Consumption Does Not Tell the Full Fiscal Story: Macroeconomic and Financial Drivers of the VAT-to-Consumption Ratio in Romania

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Abstract. *This study investigates the annual evolution of the VAT-to-consumption ratio in Romania to explore if household consumption alone determines this evolution or if other macroeconomic and financial factors contribute to it. At the intersection of fiscal analysis and applied macroeconomics, this research assumes that how consumption translates into VAT-related outcomes is not a constant mechanical function but rather may be influenced by persistence effects, labor market conditions and other costs associated with various forms of consumption. According to the empirical evidence, the VAT to consumption ratio for Romania has a high level of temporal persistence which implies that the evolution of this variable is related to current as well as historical conditions. Similarly, the findings show that labor market conditions significantly correlate with changes in this ratio, thereby indicating the value of employment-based demand structures for understanding the fiscal performance of the country. Financial conditions also have high significance since higher interest rates are associated with lower fiscal conversion from consumption into corresponding VAT results. Conversely, broad income growth dynamics seem to offer limited explanations once these other variables have been included in the analysis. This paper adds to the body of work in the literature by demonstrating that it is inappropriate to use only household consumption when trying to determine VAT-associated fiscal performance. The findings for the country of Romania indicate that macroeconomic conditions and financial conditions are necessary to consider when evaluating how household consumption translates into fiscal outcomes, allowing for a more comprehensive interpretation of indirect taxes and their appropriate use as policies.*

Keywords: VAT; VAT-to-Consumption Ratio; Fiscal Performance; Macroeconomic Conditions; Romania.

Introduction

Modern public finance has turned to use of value added tax (VAT) to generate revenue because it has broad revenue generation capacity and links directly to household spending, aggregate demand and the overall economy. VAT also has significance to the economy beyond just revenue generating as tax effects are determined by what consumption will be when taxed and how taxes are designed and how they operate within the larger fiscal system. Relationship between VAT and economic activity is determined by both tax rates and by breadth of base and quality of collections which contributes to the inseparable nature of VAT performance and where it operates macroeconomically (Keen & Lockwood, 2010; Alm & El-Ganainy, 2013; Acosta-Ormaechea & Morozumi, 2021).

A large portion of the literature has moved away from statutory tax policies and instead has been examining the gap between the theoretical liability for VAT and the actual revenue collected. From this view, the fiscal outcome for a particular jurisdiction or country is determined not by the formal tax laws alone, but rather by three major factors: 1) the quality of the administrative system; 2) the capacity of the enforcement authorities; and 3) the behaviour of the taxpayers (this includes both compliance and non-compliance) and the differences between the policy rules for VAT and the

compliance levels that actually occur. As such, we argue that the VAT efficiency measure provides more information than the nominal tax rate alone, particularly within the European context where countries may have similar rates of taxation but will generate different levels of revenue for different time periods (Aizenman & Jinjark, 2008; Zídková, 2014; Cnossen, 2022; Cuceu, et al., 2024).

Digitalization and public administration's ability to successfully deal with more detailed data has come up as a new direction of research regarding VAT performance. The use of electronic invoices, digital reporting systems, and other e-government capabilities have become linked to higher rates of compliance and stable revenue (i.e., lower risk of variance) when the modernization of an administration decreases informational frictions or the time it takes to enforce rules. This line of reasoning also mirrors findings from multiple studies throughout Europe that indicate that a country's level of digital maturity positively impacts its overall economy when coordination, processing of information, and responsiveness of institutions are needed. (Bellon et al., 2022; Zídková et al., 2024; Cetulean et al., 2026)

Research on fiscal outcomes and the economic performance of tax systems reveals that macroeconomic conditions are key determinants of the performance of a country's tax system (Castro & Ramírez Camarillo, 2014; Castañeda Rodríguez, 2018; Mawejje & Sebudde, 2019; Nguyen Minh Ha et al., 2022). The impact that macroeconomic conditions (unemployment, inflation, and growth) have on fiscal outcomes varies based on the country's economy's structure; its economic cycle; the economy's overall labour market conditions; and how efficiently the economy converts potential tax revenue into actual tax collections. As a result, macroeconomic conditions are important determinants of tax system performance across countries and time (Castro & Ramírez Camarillo, 2014; Castañeda Rodríguez, 2018; Mawejje & Sebudde, 2019; Nguyen Minh Ha et al., 2022).

These issues are still very relevant in both Romania and the larger European context due to the fact that VAT results come from both cyclical changes and those that are structural or deeper than cyclical. Changes in VAT policy also can impact larger macroeconomic conditions, and determinants for tax revenues in Central and Eastern Europe are both strongly reliant on overall economic fundamentals. Research conducted in Romania has shown that VAT fiscality can effect downstream business performance at the sector level as well. The same structural conditions related to employment, innovation, and sustainability define the environment wherein fiscal systems operate and function (Andrejovská & Helcmanovska, 2021; Đurović Todorović et al., 2024; Badiu et al., 2024; Hrebenciuc et al., 2025).

This study investigates the role of household consumption in explaining how the ratio of value added tax (VAT) to total consumption (VAT) in Romania has changed over time. The results are based on annual data, and the authors focus on the relationships between persistence, labor force participation, inflation, and financing conditions when analyzing the VAT performance in context with the overall economic environment. The remainder of the paper is structured according to: review of pertinent literature; research methodology; presentation of results and discussion; conclusion.

Literature review

The literature on value added tax recognizes that its overall effects exceed those of simply collecting revenue, and thus its true incidence is affected not only by how households consume goods but also how policymakers design their policies and how indirect taxes work together with compensatory measures in determining their true incidence. As such, resources being administered via VAT are particularly important in discussions around both fiscal capacity and distributional

outcomes, particularly where the difference between statutory neutrality and the actual incidence of VAT is large (McGowan & Billings, 1997; Alavuotunki, Kaivola & Niva, 2019; Warwick, Sweeney, McGowan, & Billings, 2022).

A second strand of the literature on VAT is focused on VAT performance as it relates to efficiency and the VAT gap. Here, the main focus is not just on how many different taxes are legislated, but more particularly, on the extent to which the theoretical tax liabilities are actually converted to revenue based upon real institutional environments. Analysis in this area indicates that the effectiveness of the VAT depends on a variety of factors including; the complexity of policy, the number of VAT rates, the volume of exemptions, and also the various ways that compliance losses are estimated over time and across different jurisdictions. Because of this, VAT performance is now being evaluated more and more by way of how well policy design interacts with how well implementation takes place instead of how statutory taxation takes place (Kowal, 2021; Nerudová & Dobranschi, 2019; Pastusiak et al., 2022).

The third body of research investigates how VAT operates not only based on total revenues, but also based on how well the government is able to enforce VAT regulations, plus how complicated it is to collect VAT from different businesses and industries. Researchers have used this framework to help explain how the same VAT system might yield different results when all relevant institutional factors are accounted for, especially in developing or transitioning economies (Olexová et al., 2022; Mascagni et al. 2023; Mudiyansele & Chen, 2022).

There is also a large amount of literature that links VAT performance with structural changes in the economy, visibility of taxable transactions, and changes in payment methods. They argue that the level of performance of the VAT is related to the degree of verifiable and visible transactions within the tax collecting system. Empirical studies have shown that indirect tax (VAT) shift does not result in increased revenues in a uniform manner and that traceable payments and use of credit/debit cards increase compliance due to reduced underreporting and increase the amount of information available to tax authorities. Therefore, both transaction and technological context are very important contributors to VAT performance, rather than an ancillary institutional detail (Adandohoin, 2021; Madzharova, 2020; Hondroyannis & Papaoikonomou, 2017).

VAT performance has been linked to larger processes of administrative reform, technological advancement and structural transformation within the expanded realm of fiscal literature. The repeated presence of digitalization, simplification and institutional coordination in explaining why some VAT systems convert tax potential into actual revenue more efficiently than others demonstrates this relationship. Recent modelling work also connects the role of digital transformation with structural performance and competitiveness in Europe while other modelling studies place importance on investment, governance and human capital as the main drivers of economic results across Central and Eastern Europe. These contributions help to define VAT performance as being part of a larger institutional capability and structural change context rather than being narrowly defined as tax-specific alone (Alognon et al., 2021; Martínez et al., 2022; Cetulean 2023; Cetulean et al., 2024; Hrebenciuc et al., 2026).

The literature contains an unfilled void. Most of the previous research around this topic has investigated aspects of indirect taxation as follows: value added tax rates, value added tax gaps, tax policy efficiency, the quality of tax administration institutions and the degree of use of digital compliance instruments and impact of country-specific indirect taxation on the overall evolution of tax revenues cross-countries. In contrast, there have been very few studies that have looked at single country estimates of the evolution of VAT expressed as a ratio of total consumption,

indicating that an unfilled void exists, and thereby this paper endeavours to address that by examining how VAT as an indicator of consumption in Romania has historically responded to factors such as expenditure, unemployment, inflation, lending conditions and economic growth (Lapinskas et al., 2023; Cornevin et al., 2024; Sinaga et al., 2023).

Methodology

This study employs an econometric approach to examine the macroeconomic determinants of value added tax performance in Romania over the period 2000-2023. The empirical design is developed in a time series framework and focuses on two complementary dimensions of fiscal performance: value added tax revenues and the value added tax to household consumption ratio. This distinction is important because it allows the analysis to capture both the absolute dynamics of tax revenues and their evolution relative to the domestic consumption base.

The analysis is guided by the following research question: to what extent can value added tax performance in Romania be explained by macroeconomic conditions such as unemployment, inflation, lending conditions, household consumption, and economic growth?

H1: value added tax performance is persistent over time, such that past values significantly influence current outcomes.

H2: unemployment has a significant effect on value added tax performance.

H3: inflation and lending conditions significantly influence value added tax dynamics.

H4: household final consumption is positively associated with value added tax revenues.

H5: economic growth contributes to changes in the value added tax to consumption ratio.

The dataset was compiled from Eurostat and covers annual observations for Romania from 2000 to 2023. The empirical analysis was conducted in RStudio, version 2024.12.1+563, which was used for data preparation, estimation, diagnostic testing, and graphical output. The initial database included a broader set of fiscal and macroeconomic indicators, but the final specifications retained only those variables that were theoretically relevant and empirically suitable for the estimated relationships.

The empirical strategy began with the cleaning, standardization, and numerical transformation of all variables, followed by their chronological ordering within the sample period. To capture VAT performance relative to its underlying consumption base, the study constructed the following indicator:

$$\text{VATRatio}_t = \frac{\text{VAT}_t}{\text{HFC}_t}$$

where denotes VATRatio_t the ratio of value added tax revenues to household final consumption in year t , VAT_t represents value added tax revenues, and HFC_t denotes household final consumption expenditure. In addition, lagged values and annual changes were generated in order to account for persistence and short-term adjustment:

$$\text{LagVAT}_t = \text{VAT}_{t-1}$$

$$\text{LagVATRatio}_t = \text{VATRatio}_{t-1}$$

$$\Delta \text{VAT}_t = \text{VAT}_t - \text{VAT}_{t-1}$$

$$\Delta \text{VATRatio}_t = \text{VATRatio}_t - \text{VATRatio}_{t-1}$$

The lagged variables capture the dynamic continuity of fiscal outcomes, while the first difference terms reflect year to year variation.

The econometric framework consists of three linear regression models estimated by ordinary least squares. The first two specifications explain the value added tax to consumption ratio, while the third explains value added tax revenues directly:

$$\text{VATRatio}_t = \alpha + \beta_1 \text{VATRatio}_{t-1} + \beta_2 \text{Unemployment}_t + \beta_3 \text{Inflation}_t + \beta_4 \text{GDPpcGrowth}_t + \varepsilon_t$$

$$\text{VATRatio}_t = \alpha + \beta_1 \text{VATRatio}_{t-1} + \beta_2 \text{Unemployment}_t + \beta_3 \text{LendingRate}_t + \beta_4 \text{GDPpcGrowth}_t + \varepsilon_t$$

$$\text{VAT}_t = \alpha + \beta_1 \text{VAT}_{t-1} + \beta_2 \text{HFC}_t + \beta_3 \text{Unemployment}_t + \beta_4 \text{Inflation}_t + \varepsilon_t$$

The first model evaluates the role of inflation in shaping the VAT ratio, the second replaces inflation with lending conditions in order to capture the financial channel, and the third examines the direct determinants of VAT revenues. This modelling structure allows a comparative assessment of relative and absolute fiscal performance. To strengthen inference, the study complements ordinary least squares estimation with Newey West robust standard errors, which correct for potential heteroskedasticity and autocorrelation in the residuals. Model adequacy is further assessed through the Breusch Pagan test, the Breusch Godfrey test, the Ramsey RESET test, and variance inflation factors. The preferred specification is selected on the basis of adjusted R^2 , Akaike information criterion, Bayesian information criterion, and overall diagnostic performance. Several limitations should nevertheless be acknowledged. The annual sample remains relatively small, the analysis is restricted to a single country, and the selected regressors cannot fully capture institutional or administrative determinants of tax collection. In addition, the linear structure of the models may not reflect more complex nonlinear or regime dependent relationships. Even so, the methodological framework provides a coherent and empirically grounded basis for evaluating the macroeconomic drivers of value added tax performance in Romania.

Results and discussions

According to the empirical data, the impermeant of value-added taxes in Romania is influenced by certain things such as fiscal trend and macroeconomic environment. Most importantly these factors affect both correlation between VAT movements based on the level of _expenditures by households and also on changes in the labor mist, pricing environment and the ability to finance consumer spending. There is significant difference between the two types of relative measures, however, absolute VAT taxes are determining an overall variance and not the fiscal trend. The income value of the two measures determines how much variance the VAT taxes each household has and gives a better representation of what actual changes/increases will occur when changes happen in either relative measure.

Table 1 indicates that the fiscal profile of VAT revenues is relatively steady beneath the more unstable macroeconomic environment that surrounds their respective performances. The average VAT revenue is 7.104, with all observed values falling between 6.100 and 8.200. The mean for household final consumption is 64.810, with all observed values falling between 61.000 and 71.100. The average VAT ratio is 0.1098, with the 0.1085 median VAT ratio indicating that the variation in VAT performance relative to consumption is relatively small (VAT ratio averages for sample 0.0910 - 0.1336). In contrast, inflation rates for the sample range from -1.545 to 45.667 and the lending rates from 5.565 - 53.850; this demonstrates that changes in both nominal and financial conditions have been much greater than those of the core fiscal indicators associated with household final consumption.

Table 1. Descriptive statistics of the main variables, Romania, 2000-2023

Variable	Obs.	Mean	Median	Min	Max
Value added taxes	24	7.104	7.000	6.100	8.200
Household final consumption	24	64.810	63.800	61.000	71.100
VAT ratio	24	0.1098	0.1085	0.0910	0.1336
Unemployment	24	6.342	6.798	3.912	8.112
Inflation	24	9.312	5.688	-1.545	45.667
Lending rate	24	15.943	11.728	5.565	53.850
GDP per capita growth	24	4.419	4.550	-4.726	11.144

Source: Authors' own data processing using RStudio.

This broader relationship is visible in Figure 1, where household final consumption remains consistently above VAT revenues throughout the sample. Consumption fluctuates approximately between 61 and 71, while VAT revenues move within a much narrower corridor, roughly between 6.1 and 8.2. Both series reach relatively stronger values in the first half of the sample, after which consumption declines and stabilizes, while VAT revenues continue to move in a more compressed range. The two trajectories therefore evolve in the same general direction without exhibiting proportional year to year changes, which suggests that the tax base alone does not fully account for the observed fiscal outcomes.

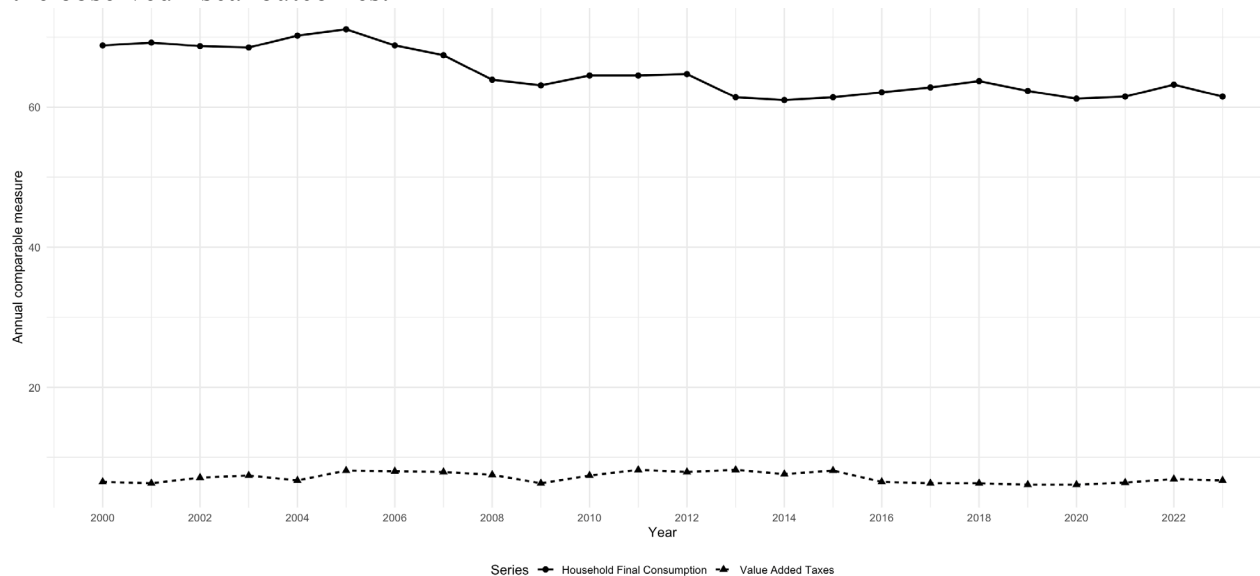


Figure 1. Evolution of Value Added Tax Revenues and Household Final Consumption in Romania, 2000-2023

Source: Authors' own data processing using RStudio.

The associations reported in Table 2 provide an initial indication of the relationships later tested econometrically. VAT revenues are strongly and positively correlated with the VAT ratio ($r = 0.891$), while the VAT ratio is negatively associated with inflation ($r = -0.480$) and the lending rate ($r = -0.422$). Household final consumption is positively correlated with inflation ($r = 0.600$) and especially with the lending rate ($r = 0.731$), whereas inflation and lending rates themselves display a very strong positive correlation ($r = 0.939$). These values are substantively important because they indicate that VAT performance relative to consumption tends to weaken under nominal and financial pressure, while also confirming that inflation and lending conditions should not be forced into the same specification.

Table 2. Correlation Matrix of the Main Fiscal and Macroeconomic Variables

Variable	VAT revenues	Household consumption	VAT ratio	Unemployment	Inflation	Lending rate	GDP pc growth
VAT revenues	1.000	0.183	0.891	0.589	-0.230	-0.111	0.123
Household consumption	0.183	1.000	-0.279	0.559	0.600	0.731	0.398
VAT ratio	0.891	-0.279	1.000	0.334	-0.480	-0.422	-0.061
Unemployment	0.589	0.559	0.334	1.000	0.302	0.504	0.019
Inflation	-0.230	0.600	-0.480	0.302	1.000	0.939	0.100
Lending rate	-0.111	0.731	-0.422	0.504	0.939	1.000	0.113
GDP per capita growth	0.123	0.398	-0.061	0.019	0.100	0.113	1.000

Source: Authors' own data processing using RStudio.

The trajectories in Figure 2 provide clarity on the nature of these changes: while the VAT-consumption ratio is considerably higher than in the base year for the vast majority of the sample, it is around 120–130 in multiple periods of time; and, on the same index, the unemployment rate is much lower than in the base year, with most of the sample displaying values between 60 and 105. It's also important to note that inflation has shown the most dramatic change among the variables discussed above. After falling from 100 in the base year to around or slightly below zero by the middle of the sample, it has increased somewhat since then. As a result, it can be seen from this exhibit that the VAT-consumption ratio improved more than expected with the decrease in inflation, while the unemployment rate appears to behave differently from period to period, indicating that fiscal performance was influenced by the labor market and price environment through different mechanisms.

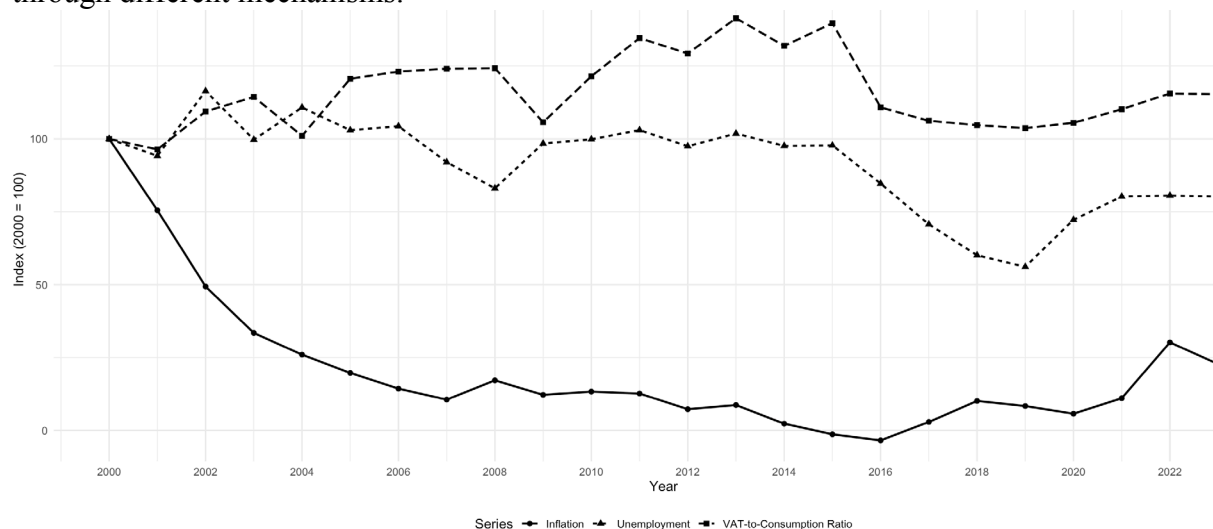


Figure 2. Indexed Dynamics of the VAT-to-Consumption Ratio, Unemployment, and Inflation in Romania, 2000-2023

Source: Authors' own data processing using RStudio.

Confidence in these results is enhanced by the empirical diagnostics calculated based on the preferred specification. The Breusch-Pagan and Breusch-Godfrey diagnostic tests, respectively, can both, confirm that the regression model has no signs of either heteroskedasticity (p-value =

0.3543) or serial correlation through the presence of first-order terms (p -value = 0.1760). The RESET (Ramsey regression specification error test) confirms that no deviations from functional form exist based on the preferred specification (p -value = 0.1733) while further supporting the robustness of the estimation results. The maximum variance inflation factor statistic of 2.54, as being well below the commonly used thresholds, indicates that multicollinearity will not be highly problematic. Since the empirical diagnostics confirm that the preferred regression model yields superior relative fit and exhibits statistical properties, these are significant.

The main econometric findings are reported in Table 3, where the dynamic VAT ratio specification including lending conditions emerges as the strongest model. This equation records an R^2 of 0.618 and an adjusted R^2 of 0.533, exceeding the corresponding values of Model 1 (0.528 and 0.423) and Model 3 (0.571 and 0.476). Under Newey West robust inference, unemployment remains positive and statistically significant ($\beta = 0.0075$, $p = 0.0068$), while the lending rate exerts a negative and statistically significant effect on VAT ratio ($\beta = -0.0073$, $p = 0.0054$). The lagged VAT ratio is also positive and weakly significant ($\beta = 0.2288$, $p = 0.0836$), pointing the persistence in fiscal performance, whereas GDP per capita growth is not statistically significant ($p = 0.8314$). The alternative inflation-based model also indicates a negative robust effect of inflation ($\beta = -0.00055$, $p = 0.0102$), while the revenue-based model shows that lagged VAT ($\beta = 0.2618$, $p = 0.0233$), unemployment ($\beta = 0.3751$, $p = 0.0171$), and inflation ($\beta = -0.0298$, $p = 0.0098$) retain explanatory power.

The diagnostic profile of the preferred specification strengthens confidence in these results. The Breusch Pagan test does not indicate heteroskedasticity ($p = 0.3543$), the Breusch Godfrey test does not suggest first order serial correlation ($p = 0.1760$) and the RESET test does not point to functional form misspecification ($p = 0.1733$). In addition, the maximum variance inflation factor is 2.54, well below conventional thresholds, which indicates that multicollinearity is not a serious concern. These statistics matter because they show that the preferred model is not only better fitting in relative terms, but also statistically well behaved.

Table 3. Regression results for VAT performance in Romania

Variables	Model 1: VAT ratio	Model 2: VAT ratio	Model 3: VAT revenues
Constant	0.0497*** (0.0105)	0.0478*** (0.0112)	1.0812 (2.5979)
Lagged VAT ratio	0.3157** (0.1210)	0.2288† (0.1249)	—
Lagged VAT revenues	—	—	0.2618** (0.1056)
Household final consumption	—	—	0.0316 (0.0457)
Unemployment	0.0048** (0.0020)	0.0075*** (0.0025)	0.3751** (0.1427)
Inflation	-0.0006*** (0.0002)	—	-0.0298*** (0.0103)
Lending rate	—	-0.0007*** (0.0002)	—
GDP per capita growth	0.0000 (0.0006)	0.0001 (0.0006)	—
Observations	23	23	23
R-squared	0.528	0.618	0.571
Adjusted R-squared	0.423	0.533	0.476
F-statistic (p-value)	5.036 (0.0067)	7.271 (0.0011)	5.994 (0.0030)
Breusch-Pagan p-value	0.3305	0.3543	0.4845
Breusch-Godfrey p-value	0.2258	0.1760	0.0662
RESET p-value	0.7112	0.1733	0.9369
Max VIF	2.13	2.54	2.08

Source: Authors' own data processing using RStudio.

Figure 3 demonstrates how well the selected specification replicates the actual VAT-to-consumption ratio across most (72%) of the estimation period because the fitted values track closely to the observed values throughout that time frame.

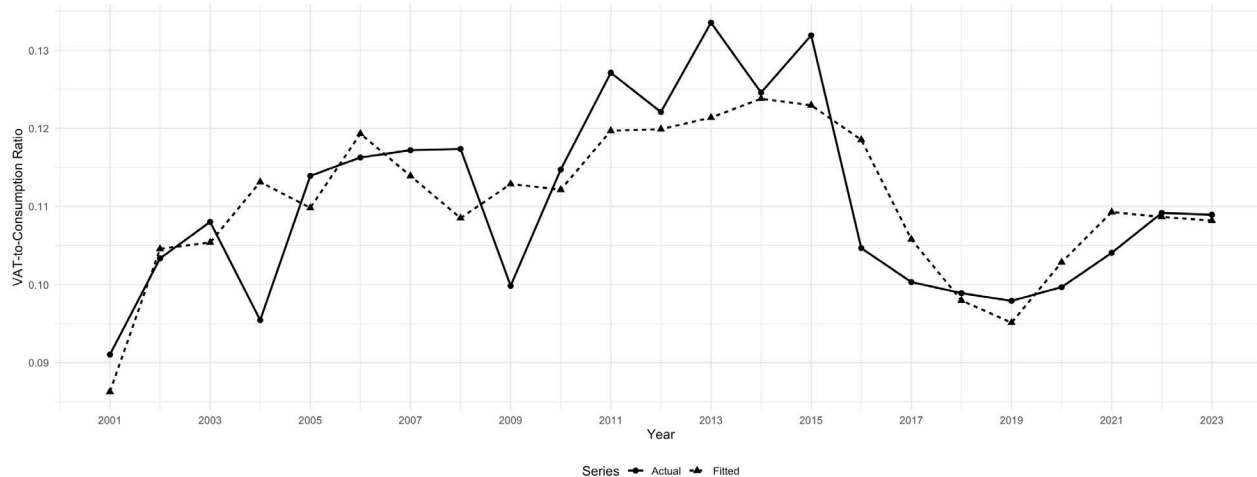


Figure 3. Actual and Fitted Values of the VAT-to-Consumption Ratio under the Preferred Model

Source: Authors' own data processing using RStudio.

The actual VAT-to-consumption ratio is bounded by approximately 0.091 and 0.134, while the fitted VAT-to-consumption ratio is bounded in a slightly tighter range of approximately 0.086 to 0.124. While the model successfully captures the upward trend in VAT-to-consumption values for the first half of the estimation period and the corresponding downward trend in VAT-to-consumption values during the second half of the estimation period, it does dampen the spikes observed near years when the actual VAT-to-consumption ratio exceeds 0.13. Overall, this demonstrates that even though a number of factors impact VAT-to-consumption values on a quarterly basis, at least the primary direction and magnitude have been captured by the model, with some short-term variability remaining unaccounted for.

Conclusion

In Romania, the macroeconomic determinants of value added tax performance have been studied. This research has found that the dynamics of VAT are influenced by persistence, labour market conditions and macrofinancial factors. Furthermore, the empirical evidence suggests that fiscal outcomes are not purely a product of the expansion or contraction of household spending - rather, they reflect a combination of the tax base, the broader economic environment, and the ongoing nature of the fiscal process. Therefore, the case of Romania is useful for understanding how indirect taxes develop in an economy adjusting to structural change, disinflationary pressures and changing financing conditions.

The analysis concludes that the VAT-to-consumption ratio clearly conveys relative and accurate information about fiscal performance compared to too many VAT-only measures. Although revenue-based specifications are still utilized, ratio-based measures better depict tax performance as they improve or deteriorate when also considering the underlying base of consumption. This important distinction separates the size of expenditure with the effectiveness of fiscal results and allows for a better interpretation of macroeconomic factors. Relative fiscal efficiency gives a stronger empirical view than using VAT-only measures by themselves. In addition, another key finding is the dynamic nature of VAT effectiveness. The high positive correlation of lagged dependent variables to current fiscal outcomes demonstrates the fiscal outcomes of today are linked back to the history of previous fiscal outcomes; therefore VAT

effectiveness does not only depend on the existing macroeconomic environment but also follows a path dependent on how organisations behave over time towards these systems. This demonstrates that the ability to collect taxes is determined by administrative continuity, continuity in the overall attitude towards tax compliance and overall development of the economy over time. Thus, improvements or declines in VAT effectiveness will occur over a longer time span while also showing the effects of cumulative processes taking place in the fiscal system.

Approximately 55% of VAT revenue collected in Romania is attributable to the economy's overall performance due to economic activity outside of the economy, such as the labor market and lending conditions. Labour market conditions are important for VAT performance, given that unemployment is a key factor in the VAT models. In addition, inflation and lending pain have negative impacts on VAT outcomes, indicating that macroeconomic instability and restrictive lending environments can negatively affect the relative strength of VAT collection. In contrast, short (one year) growth in GDP per capita has no independent explanatory power in our preferred model, implying that short-term growth by itself does not determine the fiscal dynamics of the economy when accounting for other macroeconomic variables.

From a broader economic context, the findings of this analysis indicate that a greater VAT performance correlates with stability, continuity, or positive macro-financial conditions rather than rapid growth or development. Therefore, the policy implications for improving VAT performance involves utilizing not just the efforts aimed at broadening the tax base but also those aimed at keeping price stability, avoiding distortions due to financing conditions, and creating labour market conditions conducive to stable levels of consumption and compliance with fiscal obligations. To this end, a positive interpretation places tax performance into the context of macroeconomic governance rather than as essentially an administrative matter.

The findings support the view that VAT performance in Romania is best understood as the result of an interaction between fiscal persistence and the surrounding macroeconomic environment. The preferred specification confirms that the VAT to consumption ratio offers the clearest empirical perspective, while the statistical and graphical evidence point in the same direction. Although the study is limited to a single country and a relatively short annual sample, it provides a coherent explanation of the main drivers of VAT performance. On this basis, the analysis offers a useful starting point for further research on indirect taxation, fiscal efficiency, and the macroeconomic conditions under which tax systems perform more effectively.

Acknowledgment

This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.

References

- Acosta-Ormaechea, S., & Morozumi, A. (2021). The value-added tax and growth: Design matters. *International Tax and Public Finance*, 28(5), 1211–1241. <https://doi.org/10.1007/s10797-021-09681-2>
- Adandohoin, K. (2021). Tax transition in developing countries: Do value added tax and excises really work? *International Economics and Economic Policy*, 18(2), 379–424. <https://doi.org/10.1007/s10368-021-00492-8>

- Aizenman, J., & Jinjark, Y. (2008). The collection efficiency of the value added tax: Theory and international evidence. *The Journal of International Trade & Economic Development*, 17(3), 391–410. <https://doi.org/10.1080/09638190802137059>
- Alavuotunki, K., Haapanen, M., & Pirttilä, J. (2019). The effects of the value-added tax on revenue and inequality. *The Journal of Development Studies*, 55(4), 490–508. <https://doi.org/10.1080/00220388.2017.1400015>
- Alm, J., & El-Ganainy, A. (2013). Value-added taxation and consumption. *International Tax and Public Finance*, 20(1), 105–128. <https://doi.org/10.1007/s10797-012-9217-0>
- Alognon, A. D., Koumpias, A. M., & Martinez-Vazquez, J. (2021). The impact of plastic money use on VAT compliance: Evidence from EU countries. *Hacienda Pública Española/Review of Public Economics*, 239(4), 5–26. <https://doi.org/10.7866/HPE-RPE.21.4.1>
- Andrejovská, A., & Helcmanovska, M. (2021). The impacts of changes in the value added tax rate on the economy in EU countries. *Montenegrin Journal of Economics*, 17(3), 59–69. <https://doi.org/10.14254/1800-5845/2021.17-3.5>
- Badiu, C. E., Bărbuță-Mișu, N., Chirita, M., Soare, I., Zlati, M. L., Fortea, C., & Antohi, V. M. (2024). Modelling the impact of VAT fiscality on branch-level performance in the construction industry: Evidence from Romania. *Economies*, 12(2), Article 30. <https://doi.org/10.3390/economies12020030>
- Bellon, M., Dabla-Norris, E., Khalid, S., & Lima, F. (2022). Digitalization to improve tax compliance: Evidence from VAT e-invoicing in Peru. *Journal of Public Economics*, 210, Article 104661. <https://doi.org/10.1016/j.jpubeco.2022.104661>
- Castañeda Rodríguez, V. M. (2018). Tax determinants revisited: An unbalanced data panel analysis. *Journal of Applied Economics*, 21(1), 1–24. <https://doi.org/10.1080/15140326.2018.1526867>
- Castro, G. Á., & Ramírez Camarillo, D. B. (2014). Determinants of tax revenue in OECD countries over the period 2001–2011. *Contaduría y Administración*, 59(3), 35–59. [https://doi.org/10.1016/S0186-1042\(14\)71265-3](https://doi.org/10.1016/S0186-1042(14)71265-3)
- Cetulean, M. (2023). The impact of scientific research centers on digital transformation at EU level. *Business and Management* 2023, 1056. <https://doi.org/10.3846/bm.2023.1056>
- Cetulean, M., Bodislav, D. A., Georgescu, R. I., Moroianu, N., Popa, R. A., & Papuc, C. M. (2026). When does digital maturity become a systemic advantage? Modelling e-commerce behaviour and competitiveness in Europe. *Systems*, 14(2), Article 118. <https://doi.org/10.3390/systems14020118>
- Cetulean, M., Tănase, L.-M., & Popovici, N. (2024). Unveiling the economic impact of technology trade in leading global economies. *Proceedings of the International Conference on Business Excellence*, 18(1), 2706–2718. <https://doi.org/10.2478/picbe-2024-0226>
- Cnossen, S. (2022). The C-inefficiency of the EU-VAT and what can be done about it. *International Tax and Public Finance*, 29(1), 215–236. <https://doi.org/10.1007/s10797-021-09683-0>
- Cornevin, A., Corrales, J. S., & Mojica, J. P. A. (2024). Do tax revenues track economic growth? Comparing panel data estimators. *Economic Modelling*, 140, 106867. <https://doi.org/10.1016/j.econmod.2024.106867>
- Cuceu, I. C., Florescu, D. R., & Văidean, V. L. (2024). The determinants of compliance VAT gap. *The Journal of Risk Finance*, 25(2), 277–292. <https://doi.org/10.1108/JRF-10-2023-0255>

- Đurović Todorović, J., Đorđević, M., Mirović, V., Kalaš, B., & Pavlović, N. (2024). Modeling tax revenue determinants: The case of Visegrad Group countries. *Economies*, 12(6), Article 131. <https://doi.org/10.3390/economies12060131>
- Hondroyiannis, G., & Papaoikonomou, D. (2017). The effect of card payments on VAT revenue: New evidence from Greece. *Economics Letters*, 157, 17–20. <https://doi.org/10.1016/j.econlet.2017.05.009>
- Hrebenciuc, A., Georgescu, R. I., Cetulean, M., Frătilă, A., & Bondac, G.-T. (2026). Foreign direct investment and economic growth in Central and Eastern Europe: The moderating role of governance and human capital. *Systems*, 14(2), Article 136. <https://doi.org/10.3390/systems14020136>
- Hrebenciuc, A., Iacob, S.-E., Constantin, A., Cetulean, M., & Bondac, G.-T. (2025). The employment trilemma in the European Union: Linking academia, industry, and sustainability through dynamic panel evidence. *Sustainability*, 17(13), Article 6125. <https://doi.org/10.3390/su17136125>
- Keen, M., & Lockwood, B. (2010). The value added tax: Its causes and consequences. *Journal of Development Economics*, 92(2), 138–151. <https://doi.org/10.1016/j.jdeveco.2009.01.012>
- Kowal, A. (2021). VAT efficiency: A discussion on the VAT system in the European Union. *Sustainability*, 13(9), 4768. <https://doi.org/10.3390/su13094768>
- Lapinskas, A., Makhova, L., Haikin, M., Troyanskaya, M., & Mutalimov, V. (2023). Longevity of EU membership and VAT practices: Dependencies, contradictions and implications. *Journal of Policy Modeling*, 45(3), 630–643. <https://doi.org/10.1016/j.jpolmod.2023.03.001>
- Madzharova, B. (2020). Traceable payments and VAT design: Effects on VAT performance. *CESifo Economic Studies*, 66(3), 221–247. <https://doi.org/10.1093/cesifo/ifaa003>
- Martínez, Y. U., Arzoz, P. P., & Arregui, I. Z. (2022). Tax collection efficiency in OECD countries improves via decentralization, simplification, digitalization and education. *Journal of Policy Modeling*, 44(2), 298–318. <https://doi.org/10.1016/j.jpolmod.2022.03.003>
- Mascagni, G., Dom, R., Santoro, F., & Mukama, D. (2023). The VAT in practice: Equity, enforcement, and complexity. *International Tax and Public Finance*, 30(2), 525–563. <https://doi.org/10.1007/s10797-022-09743-z>
- Mawejje, J., & Sebudde, R. K. (2019). Tax revenue potential and effort: Worldwide estimates using a new dataset. *Economic Analysis and Policy*, 63, 119–129. <https://doi.org/10.1016/j.eap.2019.05.005>
- McGowan, J. R., & Billings, B. A. (1997). An analysis of the European community VAT: Implications for U.S. tax policy. *Journal of International Accounting, Auditing and Taxation*, 6(2), 131–148. [https://doi.org/10.1016/S1061-9518\(97\)90002-1](https://doi.org/10.1016/S1061-9518(97)90002-1)
- Mudiyansele, H. K., & Chen, S. X. (2022). What impairs the ‘money machine’ of VAT in developing countries? *International Tax and Public Finance*, 29(5), 1128–1159. <https://doi.org/10.1007/s10797-021-09705-x>
- Nerudová, D., & Dobranschi, M. (2019). Alternative method to measure the VAT gap in the EU: Stochastic tax frontier model approach. *PLOS ONE*, 14(1), e0211317. <https://doi.org/10.1371/journal.pone.0211317>
- Nguyen Minh Ha, N., Pham Tan Minh, P., & Quan Minh Quoc Binh, Q. M. (2022). The determinants of tax revenue: A study of Southeast Asia. *Cogent Economics & Finance*, 10(1), Article 2026660. <https://doi.org/10.1080/23322039.2022.2026660>

- Olexová, C., Sudzina, F., & Cakoci, K. (2022). The VAT gap in relation to the quality of governance in selected CEE countries. *Journal of Eastern European and Central Asian Research*, 9(3), 385–398. <https://doi.org/10.15549/jeecar.v9i3.791>
- Pastusiak, R., Bolek, M., & Pluskota, A. (2022). VAT gap determinants in the European Union. *Studia Prawno-Ekonomiczne*, 123, 119–132. <https://doi.org/10.26485/SPE/2022/123/7>
- Sinaga, S. T., Ekananda, M., Gitaharie, B. Y., & Setyowati, M. (2023). Tax buoyancy in Indonesia: An evaluation of tax structure and policy reforms. *Economies*, 11(12), 294. <https://doi.org/10.3390/economies11120294>
- Warwick, R., Harris, T., Phillips, D., Goldman, M., Jellema, J., Inchauste, G., & Goraus-Tańska, K. (2022). The redistributive power of cash transfers vs VAT exemptions: A multi-country study. *World Development*, 151, 105742. <https://doi.org/10.1016/j.worlddev.2021.105742>
- Zídková, H. (2014). Determinants of VAT gap in EU. *Prague Economic Papers*, 23(4), 514–530. <https://doi.org/10.18267/j.pep.496>
- Zídková, H., Arltová, M., & Josková, K. (2024). Does the level of e-government affect value-added tax collection? A study conducted among the European Union Member States. *Policy & Internet*, 16(3), 567–587. <https://doi.org/10.1002/poi3.389>