Buriak, G. S. (2026). Economic velocity and digital governance: Panel evidence on macroeconomic stability and institutional quality. *Actual Issues of Modern Science. European Scientific e-Journal, 41*, __–__. Ostrava.

DOI: 10.47451/esej-ecn-54

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Economic Velocity and Digital Governance: Panel Evidence on Macroeconomic Stability and Institutional Quality

Abstract:
The relevance of this study lies in the growing importance of speed, automation, and digital coordination as determinants of macroeconomic stability and institutional quality in an increasingly competitive and crisis-prone global environment. As governments pursue digital transformation, empirical evidence linking economic velocity and digital governance to stability outcomes remains limited and fragmented. The subject of the study is the relationship between accelerated economic and administrative processes — operationalized through money velocity and e-government development — and their effects on macroeconomic stability and institutional quality. The object of the study consists of national macroeconomic and institutional systems observed across countries over the period 2010–2025, including monetary circulation dynamics, GDP growth volatility, regulatory quality, and digital governance indicators. The study aims to empirically test the Fast State governance model by assessing whether higher money velocity and greater automation of public administration contribute to more stable economic performance and stronger institutions. The study employs panel regression methods using cross-country data from the World Bank, the International Monetary Fund, the UN E-Government Survey, and the Worldwide Governance Indicators, with controls for income level and robustness checks through outlier filtering. The literature review integrates insights from monetary theory on money velocity, Keynesian transmission mechanisms, and institutional economics, alongside empirical research on e-government, corruption reduction, and regulatory effectiveness. Prior studies establish separate links between velocity and macroeconomic dynamics, as well as between digital governance and institutional quality; however, this study advances the literature by synthesizing these strands into a unified empirical framework centered on governance speed and process automation. The paper examines the Fast State governance model, which posits that accelerating financial flows and automating administrative procedures improve macroeconomic stability and institutional quality. Using 2010–2025 panel data from the World Bank, IMF, and UN E-Government Survey, the study tests two hypotheses: (1) higher money velocity correlates with lower GDP growth volatility, and (2) e-government development predicts stronger regulatory quality. Results confirm both propositions. Velocity shows significant negative association with output volatility ($\beta = -0.379$, $p < 0.01$), while e-government development significantly predicts regulatory quality improvements ($\beta = 0.419$, $p < 0.01$, $R^2 = 0.628$). The contribution is an integrated framework linking velocity in state and market processes to economic resilience. Policy implications are immediate: predictable acceleration and process automation can stabilize demand transmission and strengthen governance. The findings provide evidence-based guidance for governments pursuing digital transformation, with particular relevance for post-crisis recovery strategies.

Keywords: Fast State, velocity of money, macroeconomic stability, e-government, institutional quality, digital governance, automation, panel data.

Abbreviations:

EGDI is E-Government Development Index;

GDP is Gross Domestic Product;

GNI is Gross National Income;

IMF is International Monetary Fund;

M2 is Broad Money Supply;

OECD is Organisation for Economic Co-operation and Development;

UN is United Nations;

WDI is World Development Indicators;

WGI is Worldwide Governance Indicators

Introduction

Technological advancement and global competition increasingly define the environment where speed and agility of governance become critical determinants of national success. The Fast State model refers to a paradigm in which government and economic processes are accelerated through digital transformation and automation (*Buriak, 2023*; *Buriak, in press*; *Zharova, 2023*). Proponents argue that states which move quickly in financial transactions, administrative procedures, and service delivery achieve greater economic stability and stronger institutions.

Despite substantial research on money velocity, e-government efficiency, and ease of doing business individually, few studies synthesize these approaches into a unified empirical design testing how velocity across fiscal-monetary transmission and digital administration jointly shapes stability and institutional quality. This study addresses the gap by examining two questions: Does higher money velocity correspond to greater macroeconomic stability? Does e-government development improve institutional quality?

Conceptually, the paper integrates quantity theory and Keynesian transmission mechanisms for velocity analysis with institutional economics for automation effects. Empirically, it employs 2010–2025 cross-country panels with pooled regressions, income controls, and explicit outlier filtering. The study provides evidence-based guidance for governments pursuing digital transformation, quantifying gains from specific reforms. Main contributions include a unified speed-centric governance lens and policy-oriented estimates linking reforms to measurable outcomes.

The subject of the study is the relationship between the speed of economic and administrative processes—conceptualized through money velocity and digital governance—and their impact on macroeconomic stability and institutional quality within national economies.

The object of the study comprises cross-country macroeconomic and institutional systems observed over the period 2010–2025, including monetary circulation dynamics, e-government development, regulatory quality, and GDP growth volatility as measured by internationally comparable indicators.

The study aims to empirically test the Fast State governance model by assessing whether accelerated monetary circulation and automated public administration contribute to greater macroeconomic stability and improved institutional quality across countries.

According to the purpose of the study, objectives are:

- conceptualize the Fast State model as an integrated framework linking economic velocity and digital governance;
- examine the relationship between money velocity and GDP growth volatility using panel regression analysis;
- assess the impact of e-government development on regulatory quality as an indicator of institutional strength;
- control for income-level differences in evaluating macroeconomic and governance outcomes;
- provide empirically grounded policy implications for digital transformation and governance reform.

The results of this study are intended to inform policymakers, public administration reformers, and researchers by providing evidence-based guidance on how accelerating financial flows and automating government procedures can enhance economic resilience and institutional quality. The findings may be applied in the design of digital governance strategies, post-crisis recovery policies, and comparative analyses of state capacity in the context of economic and technological transformation.

Theoretical Foundations

Money Velocity and Macroeconomic Stability

Monetary theory traditionally links money supply and price levels through velocity, defined as the frequency money circulates in an economy (*Brunner & Meltzer, 1971*). The fundamental quantity theory formula $M \times V = P \times Q$ establishes velocity (V) as crucial for understanding how money supply (M) affects price level (P) and real output (Q). Recent research reiterates that velocity fluctuations crucially modulate inflationary pressures and economic growth (*Powell, 2025*).

Empirical findings suggest economies with higher velocity tend to exhibit lower GDP dynamics volatility, indicating efficient demand transmission (*Yilmaz et al., 2024*). The 2008 global financial crisis and 2020 pandemic saw massive falls in money velocity as uncertainty led to cash hoarding (*Caplan, 2009*). Japan's experience in the late 1990s offers a cautionary tale: drastic velocity decline after the banking crisis led to persistent deflation (*Sudo, 2011*). These observations underscore the theoretical link between monetary circulation and macroeconomic health.

Velocity's responsiveness to digital payment systems signals a need to integrate techno-economic dynamics into macroeconomic policy (*Azzahrah et al., 2024*). The proliferation of digital payments can increase effective velocity without inflation, by reducing idle balances (*Chadha et al., 2021*).

Thus, the literature establishes velocity as an important indicator of economic vitality. When velocity falters unexpectedly, it signals trouble, making policies to unblock monetary flow crucial for stability. The Fast State model builds on these insights, hypothesizing that economies maintaining brisk monetary circulation demonstrate greater resilience to demand shortfalls and output volatility.

E-Government and Institutional Quality

E-government development accelerates and automates administrative processes, leading to improved transparency, reduced corruption, and enhanced regulatory effectiveness (*Ninyuk, 2025*). Automation minimizes personal interactions and discretionary decision-making, thereby closing avenues for petty corruption and bribery while standardizing processes for predictability.

Seiam and Salman (*2024*) examined 110 countries (2003–2021) and found significant negative correlations between the UN E-Government Development Index and corruption levels. This confirms earlier research showing countries embracing digital governance experience corruption reductions (*Shim & Eom, 2008*). The primary mechanisms are increased transparency, accountability, and reduced official discretion when rules are embedded in code.

Beyond corruption, automation improves predictability and efficiency. Wallis and Zhao (*2017*) found countries with mature e-government systems achieved higher Government Effectiveness scores. Digital systems enforce standard operating procedures uniformly, ensuring consistent treatment for citizens and businesses. Ukraine's Diia platform illustrates how digital tools raise public trust despite ongoing governance challenges (*Ninyuk, 2025*).

Thus, the literature demonstrates that automation through e-government improves institutional quality by increasing transparency, reducing discretionary corruption opportunities, and enhancing administrative predictability. The Fast State model incorporates these findings, positing that digital governance acceleration strengthens institutional foundations.

Data and Methodology

This study employs panel regression analysis to test the Fast State model using cross-country data from 2010 to 2025. Fixed-effects and pooled regression models are utilized based on Hausman tests and data diagnostics. Panel regression controls for unobserved heterogeneity among countries that might otherwise bias estimates due to omitted time-invariant factors.

To ensure robustness against extreme outliers, observations exceeding a standard deviation of 10 were excluded. This mitigates distortion from anomalous economic crises or measurement errors. Models include GDP per capita as a control variable to account for income-level differences.

Data sources include: World Bank World Development Indicators for macroeconomic metrics; IMF for monetary indicators; UN E-Government Survey for digital governance indices; and World Bank Worldwide Governance Indicators for institutional quality. The use of consistent, internationally comparable indicators enhances cross-country comparison validity.

For Hypothesis 1, the dependent variable is GDP growth volatility (standard deviation over rolling five-year periods), while money velocity is derived as the inverse of M2/GDP ratio (V = GDP/M2). For Hypothesis 2, e-government development indices serve as the independent variable, with Regulatory Quality scores as the outcome.

Thus, the methodology employs established econometric techniques with globally recognized datasets, enabling rigorous hypothesis testing while controlling for development-level differences across countries.

Results

Money Velocity and Macroeconomic Stability

The Fast State model suggests macroeconomic stability is enhanced by increased velocity of money. Faster circulation implies funds rapidly facilitate consumption and investment, potentially smoothing economic activity. We test this using the regression specification:

$$Stability = \alpha + \beta_1 \cdot Velocity + \beta_2 \cdot log(GDP\ per\ capita) + \varepsilon$$

where

Stability is the inverse of standard deviation of GDP growth (2010–2021),

Velocity is average money velocity for the period,

GDP per capita controls for development level.

Results appear in Table 1 (*Appendix*).

The coefficient on money velocity is statistically significant and negative ($\beta = -0.379, p < 0.01$), supporting the hypothesis that faster monetary circulation contributes to greater macroeconomic stability. This finding suggests economies with more dynamic monetary flows experience fewer large output swings. The effect of income level is not statistically significant (p = 0.94), indicating that after accounting for velocity, income differences do not explain growth volatility.

The model explains a modest portion of variation (adjusted $R^2 = 0.063$), but remains statistically significant overall (Hausman test $p < 0.01$).

Thus, the evidence supports the Fast State model's claim that speeding up monetary circulation contributes to macroeconomic stability. Countries maintaining higher velocity experienced more stable outcomes over the study period, consistent with Keynesian demand dynamics where confident spending maintains economic momentum.

E-Government Development and Institutional Quality

The Fast State model posits that automation of state procedures improves governance by reducing corruption and enhancing administrative predictability. We estimate:

$$RQ\_score = \alpha + \beta_1 \cdot EGDI + \beta_2 \cdot log(GDP\ per\ capita) + \varepsilon$$

where

RQ_score is World Bank Regulatory Quality,

EGDI is the UN E-Government Development Index,

GDP per capita controls for development.

Results appear in Table 2 (*Appendix*).

The coefficient on E-Government Development Index is positive and highly significant ($\beta = 0.419,\ p < 0.01$). A full-range increase in EGDI (from 0 to 1) associates with approximately 20% improvement in Regulatory Quality scores. This effect holds controlling for GDP per capita, which itself shows positive impact (wealthier countries tend to have stronger institutions).

The within R^2 of 0.628 indicates substantial variation in institutional quality explained by changes in e-government and income. These results strongly support Hypothesis 2: automation of state procedures via e-government links to stronger institutions.

Thus, the empirical results confirm that e-government development significantly predicts improved regulatory quality. Digital governance reforms appear to enhance institutional strength

by reducing discretionary corruption opportunities and increasing administrative predictability, validating the Fast State model's core proposition.

Discussion

The findings raise important questions for further investigation. First, while the velocity-stability relationship appears robust, the causal direction warrants deeper examination. Does higher velocity cause stability, or do stable economies maintain higher velocity? Dynamic panel methods or instrumental variable approaches could address this endogeneity concern.

Second, the strong e-government effect raises questions about implementation thresholds. At what point does digital governance investment yield diminishing returns? The relationship between EGDI and institutional quality may be non-linear, with developing countries potentially gaining more from initial digitalization efforts than advanced economies from marginal improvements.

Third, the interaction between velocity and institutional quality remains unexplored. Does e-government development affect money velocity through improved financial infrastructure? Do countries with strong institutions maintain more stable velocity patterns? These interconnections suggest the Fast State model may have multiplicative rather than additive effects across domains.

Finally, external validity concerns merit attention. The 2020 pandemic disrupted both monetary circulation and governance systems globally. Further research should examine whether the relationships identified here hold under extreme stress conditions, and whether digital governance confers particular resilience advantages during crises.

Conclusion

This paper makes a significant contribution to understanding how speed in government and market processes affects macroeconomic stability and institutional quality. The empirical findings offer perspectives emphasizing the importance of digitalization and fiscal-monetary velocity in fostering resilient economies.

Two key findings emerge. First, countries with higher velocity of money generally experienced more stable macroeconomic performance, measured by lower GDP volatility. This highlights the importance of policies keeping money circulating through confidence-building measures and efficient financial systems.

Second, greater automation of state procedures, captured through e-government indices, associates with significantly improved governance indicators. This underscores a clear policy lesson: digital reforms are formidable tools for building institutional trust and reducing corruption.

These insights provide foundation for future research highlighting complex interactions among governance, economic stability, and digital transformation. From a theoretical perspective, findings contribute to bridging macroeconomics and public administration, showing that money supply dynamics and governance quality interlink through speed and efficiency dimensions.

The integrated framework opens avenues for exploring specific policy interventions and their long-term impacts across institutional settings. It underscores the necessity of context-sensitive approaches accounting for country-specific legal, cultural, and technological factors.

Policy recommendations advocate a time-centric approach to governance: minimizing delays in fiscal transfers, administrative procedures, and regulatory enforcement is as critical as reducing financial costs. Digitalization of government functions should be paired with targeted anti-corruption training, legal protections, and public awareness initiatives for maximum impact.

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Appendix

Table 1. Regression Results: Macroeconomic Stability and Money Velocity (2010–2025)

Variable	Estimate	Std. Error	t value	p-value
Intercept	4.583	1.479	3.10	0.002
Velocity	–0.379	0.139	–2.72	0.007
Log(GDP per capita)	–0.011	0.149	–0.08	0.939

Note. Adjusted $R^2 = 0.063$. Source: Author's calculations.

Table 2. Regression Results: E-Government Development and Institutional Quality

Variable	Estimate	Std. Error	t value	p-value
Intercept	–4.570	0.115	–39.59	<0.001
EGDI	0.419	0.132	3.17	0.002
Log(GDP per capita)	0.491	0.019	25.27	<0.001

Note. Adjusted $R^2 = 0.628$. Source: Author's calculations.