

SYSTEMATIC CADASTRAL REGISTRATION AND REAL-ESTATE TRANSACTION INTENSITY IN ROMANIA: A COUNTY-MONTH PANEL ANALYSIS, 2017-JUNE 2026

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Abstract

This article examines whether Romanian counties with greater end-period exposure to systematic cadastral registration displayed different real-estate sales trends during January 2017-June 2026. The study uses 4,788 county-month observations for the 41 counties and Bucharest. The dependent variable is the monthly count of immovable properties in the National Agency for Cadastre and Land Registration's (NACLR) transaction statistics, compiled from registration applications based on legal acts transferring ownership that were registered and resolved in the reference month; it is not the number or value of sale contracts. Cadastral exposure is reconstructed from the official National Cadastre and Land Registration Programme (NCLRP) annexes at 30 June 2026. The conservative measure covers 401 administrative-territorial units (ATUs) completed integrally, while a broader sensitivity measure also includes 91 partially completed ATUs. Because cadastral exposure is cumulative, observed only at the end of the sample and time-invariant within each county, the econometric exercise is descriptive rather than causal. Poisson pseudo-maximum-likelihood specifications include county indicators, calendar-month indicators, a linear trend, a March-May 2020 indicator and a post-2023 period indicator. The exposure-trend coefficient is negative in all reported specifications and reaches the conventional 5% threshold in two variants, but it becomes statistically insignificant when Bucharest, and then Bucharest and Ilfov, are excluded. The results therefore provide no robust evidence of a positive county-level sales effect. They are consistent with, but do not prove, the view that a programme concentrated in rural and low-liquidity areas may improve legal certainty and formalisation without independently creating additional market demand. Systematic registration remains important legal infrastructure, but its dynamic transaction effect cannot be identified from the present end-period exposure measure.

Keywords: cadastre, land registration, property rights, real-estate sales, Romania, panel data, Poisson pseudo-maximum-likelihood model

JEL Classification: K11, R31, O17, C23, C25

1. Introduction and context of the study

A functioning real-estate market depends not only on preferences, prices and credit, but also on an institutional infrastructure that makes assets identifiable, rights opposable and transfers enforceable. Cadastre is therefore more than a technical inventory. Together with the land register, it forms part of the legal machinery through which immovable property becomes intelligible to owners, buyers, lenders, tax authorities and courts.

The question examined here is deliberately limited: *did Romanian counties that had achieved greater systematic-registration exposure by 30 June 2026 display different monthly sales trends during January 2017-June 2026?* Transaction intensity is operationalised as the monthly count of immovable properties in NACLR's transaction statistics, which are compiled from registration applications based on legal acts transferring ownership that were registered and resolved in the reference month. The measure does not represent the number or value of contracts and is not normalised by population or by the stock of properties.

The research was first explored for Gorj County and was subsequently extended to all 41 counties and Bucharest. The national panel is the relevant basis for the present article because it prevents a single local market from being treated as representative and permits the initial institutional hypothesis to be assessed against Romania's pronounced territorial heterogeneity.

The resulting design combines an official county-month sales series with a row-level reconstruction of the cadastral status reported by NCLRP at 30 June 2026. Its main advantage is national coverage and an auditable distinction between integral and partial ATU completion. Its principal limitation is equally important: the cadastral measure is an end-period cumulative stock, not a monthly treatment variable.

Accordingly, the regressions do not estimate the effect of a county being cadastrally registered at a particular date. They test whether counties with different levels of exposure at the end of the period followed different sales trends over the period as a whole. Such differential trends may reflect cadastral formalisation, but they may also reflect demographic structure, urbanisation, construction activity, income, credit conditions, administrative capacity or the non-random territorial allocation of the programme.

The contribution is therefore twofold. First, the article translates the legal-economic theory of property-right certainty into an empirical question based on official Romanian administrative data. Second, it provides a deliberately cautious national finding: the institutional importance of cadastral formalisation is clear, but the available county-month design does not establish that end-period cadastral exposure generated higher sales growth.

2. Property certainty, legal protection and human conduct

The literature reviewed in this article is deliberately confined to the doctrinal and institutional works selected for the author's broader research framework. It is used to formulate the mechanism linking property certainty, public registration and market conduct, not to claim an exhaustive survey of the international empirical literature.

In Romanian civil-law doctrine, private ownership is structured around possession, use and disposal, exercised exclusively, absolutely and perpetually within the limits established by law. The commentary coordinated by Baias et al. treats Article 555 of the Civil Code as defining a subjective civil right protected by the legal order [1]. Stoica analyses the classic powers gathered around ownership, while Stătescu and Bîrsan place those powers within the broader architecture of real rights [23], [22]. Bîrsan similarly emphasises that the owner acts through his or her own power and interest, but within legally determined limits [2].

This civil-law framework is directly relevant to cadastral registration. A right intended to operate against third parties requires a reliable means of identifying its object, holder and encumbrances. Cadastre and land-register publicity do not create the economic usefulness of land, but they make the legal status of immovable assets more ascertainable, opposable and transferable. The empirical hypothesis tested below is therefore modest: clearer public identification of property rights may reduce transaction frictions, although it cannot by itself generate demand.

The institutional works cited in the study describe the same mechanism from a broader perspective. Libecap presents private property as an institutional arrangement allocating privileges in relation to particular goods [6]. North connects institutions with the expectations individuals form about the conduct of others, while North and Thomas place property arrangements among the institutional conditions that shape long-run economic behaviour [15], [16]. Eggertsson emphasises the authority to choose among lawful uses of an asset [4], and Ostrom and Schlager underline the relational character of property rights between present holders and other potential users [17].

Bromley's distinction between property rights and the rules governing their exercise helps explain why registration matters without turning cadastre into an all-purpose explanatory variable [3]. Schlager and Ostrom distinguish among access, withdrawal, management and exclusion, while Scott and Coustalin emphasise exclusivity, flexibility, divisibility and transferability [20], [21]. Rose likewise shows that ownership is sustained not only by control over a resource, but also by legal and social structures that make claims persuasive and recognisable [19]. For immovable property, these attributes are practically weakened when boundaries, titles or encumbrances are uncertain.

Romanian economic writing reinforces the connection between legal certainty and economic conduct. Țigănașu relates the protection of private property to economic welfare, contractual stability and the quality of judicial and administrative institutions [24]. The point is not that legislation or registration mechanically creates market dynamism. Rather, secure rights and credible publicity are among the conditions under which assets may be valued, financed, transferred and taxed.

The literature thus supplies a reason to test the relationship between systematic registration and real-estate sales, while leaving the direction and magnitude of that relationship to the data. It does not imply that registration must increase transaction counts in every territory or during every period.

3. Institutional and normative framework

Romania's cadastral and land-register system is governed primarily by Law no. 7/1996 on cadastre and real-estate publicity. The law defines cadastre and the land register as a unitary and compulsory system of technical, economic and legal evidence for immovable assets throughout the country [18]. It links that system to the identification and description of real estate, the identification of owners and lawful holders, the provision of information for taxation and the publicity through which real rights and relevant legal facts become opposable [18].

The National Cadastre and Land Registration Programme (NCLRP) is the main public programme through which systematic registration is implemented. NACLRL publishes status notes, completion annexes and maps at ATU and cadastral-sector level [8], [10]. These materials distinguish ATUs completed integrally, ATUs completed partially and work completed only in cadastral sectors. Because these categories may overlap spatially, they cannot be added mechanically as independent territorial stocks.

At 30 June 2026, NACLRL reported completed systematic-registration work in 492 ATUs: 401 completed integrally and 91 completed partially. Together with sector-level completions, the programme-wide finalised area was 8,832,437.33 hectares. Work was ongoing in 2,601 ATUs, and during the first half of 2026, systematic-registration works were completed in 47 ATUs and in cadastral sectors, covering a total area of 426,079.38 hectares [10]. A major externally financed component is explicitly rural, targeting 660 rural ATUs and 5,758,314 hectares; Bucharest and Ilfov are excluded from that component because of their urban or developed character [10]. This territorial orientation is relevant when interpreting county-level sales patterns.

The fiscal environment also changed during the observation period. Government Ordinance no. 16/2022 amended the taxation of transfers of real estate from personal patrimony with effect from 1 January 2023 [5]. The model therefore includes a post-2023 indicator, but this variable captures a broad period break and must not be interpreted as an isolated estimate of the tax amendment. NACLRL tariffs are governed by Order no. 16/2019, as subsequently amended, which establishes payment obligations for the agency's services except where legislation provides an exemption [9].

4. Data, source screening and variables

The harmonised empirical panel covers January 2017-June 2026 and comprises the 41 counties and Bucharest, yielding 4,788 county-month observations. The dependent variable is the monthly count of immovable properties in NACLRL's transaction statistics, compiled from registration applications based on legal acts transferring ownership that were registered and resolved in the reference month [7]. It does not measure sale-contract values or the number of distinct contracts.

The source archive also contained a 2009-2016 workbook on the intabulation of principal real rights by county. It was screened, including for 2015 and 2016, but was not merged with the dependent variable. Intabulations of principal real rights form a broader legal-publicity measure

than the later monthly sales statistics, and treating the two series as identical would introduce a structural break larger than the relationship under examination.

The principal cadastral variable is reconstructed from the ATU rows of NCLRP Annex 1 at 30 June 2026. The conservative specification uses the 401 ATUs recorded as completed integrally. Their rows sum to 3,896,194 land-book openings and 3,405,262.04 registered hectares. For each county, registered hectares are expressed as a share of the county's territorial surface. A broader sensitivity measure also includes the 91 partially completed ATUs, adding 713,185 land-book openings and 733,994.74 registered hectares [10].

The programme-wide total of 8,832,437.33 finalised hectares is larger because it also includes sector-level completions in ATUs that were not completed as a whole. Those works demonstrate the wider scale of the programme but cannot be incorporated without a complete county-month chronology and without risking overlap between categories. The analysis therefore uses the auditable ATU-row values. Annex 1 contains an internal arithmetic inconsistency in one printed subsection total; the county exposure file retains the sum of the 401 individual ATU rows and documents the discrepancy in the supplementary reconciliation notes.

Several additional official controls were screened. NIS TEMPO identifies county series for average net earnings (FOM106E), registered unemployment (SOM103A) and building permits (LOC108A) [12]-[14], while the National Agency for Employment publishes monthly unemployment resources [11]. These controls were not included in the final balanced panel. National monetary and credit conditions were also not separately modelled. Calendar-month indicators capture recurring seasonality only; they do not absorb month-specific macroeconomic shocks. The resulting omitted-variable risk is a central limitation and is one reason why the estimates are interpreted as exploratory differential-trend associations.

Table No. 1. Main variables and implementation status

Variable/source	Role	Implementation	Methodological note
NACLR monthly sales files 2017-2026H1	County-month count of immovable properties sold	Implemented in the working panel	114 months × 42 territorial units. The measure counts properties recorded in NACLR transaction statistics, not contracts or values.
NACLR historical 2009-2016 workbook	Intabulations of principal real rights	Screened, not harmonised	Broader legal-publicity measure; not merged with the monthly sales dependent variable.
NCLRP Annex 1, 30 June 2026	Integral and partial ATU completions by county	Fully implemented	Main measure: 401 integral ATUs; sensitivity measure adds 91 partial ATUs. The 401 rows sum to 3,405,262.04 ha and 3,896,194 land-book openings.
NACLR status note and H1-H3 maps, 30 June 2026	Programme-wide UAT and sector status	Descriptive	492 ATUs with completed work and 2,601 ATUs with work ongoing; sector totals overlap with ATU categories and are not mechanically additive.
NIS TEMPO FOM106E	Average net earnings by county	Screened, not implemented	Official series identified; omission leaves time-varying income conditions uncontrolled.
NAE/data.gov.ro unemployment datasets	Registered unemployment rate by county	Screened, not implemented	Monthly official resources exist; omission leaves local labour-market conditions

Variable/source	Role	Implementation	Methodological note
			uncontrolled.
NIS TEMPO LOC108A	Building permits by county	Screened, not implemented	Official series identified; omission leaves local construction activity uncontrolled.
NBR / monetary indicators	National monetary and credit conditions	Screened, not separately modelled	Calendar-month indicators capture seasonality only and do not absorb month-specific macroeconomic shocks.

Source: author's compilation based on NACLR, NCLRP, NIS TEMPO, NAE/data.gov.ro and NBR source screening.

5. Methodology

The dependent variable is a non-negative count. The preferred estimator is therefore Poisson pseudo-maximum likelihood (PPML) with a log link, county indicator variables and standard errors clustered by county. Let i denote counties and t months. The main cadastral measure is the county share of integral full-ATU registered area observed at 30 June 2026 and standardised across the 42 territorial units. Because this measure is constant within each county, its level is absorbed by the county indicators; only its interaction with time is estimable.

The exploratory specification is:

$$E[\text{Sales}_{it} | X_{it}] = \exp(\alpha_i + \mu_m + \tau T_t + \delta P2023_t + \kappa C_t + \beta(\text{CadExp}_i \times T_t)). \quad (1)$$

County indicators α_i absorb persistent territorial differences, including scale, geography and other time-invariant characteristics. Calendar-month indicators μ_m control recurring seasonality. T_t is a linear trend measured in years; $P2023_t$ equals one from January 2023 onward; and C_t identifies March-May 2020. The coefficient β measures whether counties with one standard deviation more end-period cadastral exposure had a different annual sales trend. It does not identify the effect of cadastral completion, because exposure is observed after most of the sales outcomes, the allocation and timing of works are not random, and time-varying county conditions are not fully controlled.

Sensitivity checks add an exposure $\times$ post-2023 interaction, exclude Bucharest, exclude Bucharest and Ilfov jointly, use a broader exposure that includes partial ATUs, and fit a negative-binomial generalised linear model with the dispersion parameter fixed at $\alpha = 1$. The latter is a functional-form sensitivity check, not a conditional fixed-effects negative-binomial estimator. With only 42 county clusters and several p-values near 0.05, statistical significance is interpreted cautiously. Figure No. 3 is purely descriptive and plots the percentage change in annual sales between 2017 and 2025 against end-period exposure; it is not a causal specification.

6. Results and discussion

6.1 National transaction dynamics

Across the 42 territorial units, the annual and partial-year totals reported in the harmonised series sum to 5,912,507 immovable properties sold during January 2017-June 2026. Before the pandemic, annual sales declined from 627,802 in 2017 to 540,180 in 2019. They increased during 2020-2022, fell in 2023 and remained below the 2021-2022 peak in 2024-2025. The first half of 2026 records 272,657 properties, 5.6% fewer than in January-June 2025. It is reported as a partial-year observation and is not compared with the whole of 2025.

The pattern is cyclical rather than monotonic. This is material for interpretation because cadastral expansion operates alongside credit costs, household income, construction, demographic change, inflation and expectations. Since the preferred specification does not separately observe these factors, the estimated exposure interactions cannot be treated as their causal substitute.

Table No. 2. National sales dynamics, 2017-June 2026

Year	Sales	Year-on-year change	Scope
2017	627,802		full year
2018	563,501	-10.2%	full year
2019	540,180	-4.1%	full year
2020	602,805	11.6%	full year
2021	698,756	15.9%	full year
2022	700,273	0.2%	full year
2023	634,843	-9.3%	full year
2024	643,334	1.3%	full year
2025	628,356	-2.3%	full year
2026	272,657	-5.6%	January-June; vs. January-June 2025

Source: author's calculation based on NACLR monthly sales files. Note: the 2026 percentage compares January-June 2026 with January-June 2025.

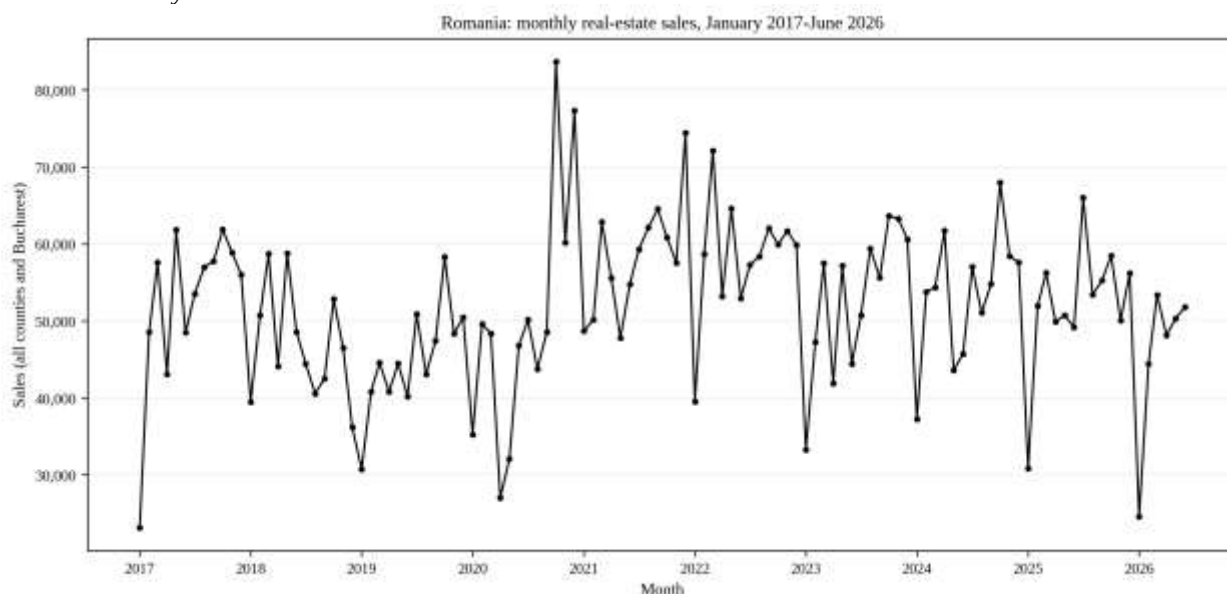


Figure No. 1. Monthly real-estate sales in Romania, January 2017-June 2026

6.2 Territorial concentration

The territorial distribution of properties sold is highly uneven. Bucharest is by far the largest market, followed by Ilfov and the major urbanised counties. This concentration matters because a small number of metropolitan markets can dominate national totals while having limited resemblance to the rural and semi-rural areas in which much systematic-registration work is undertaken. The largest territorial markets are reported in Table No. 3 and Figure No. 2.

Bucharest alone accounts for more than one million properties sold over the observation period. By contrast, many counties with substantial systematic-registration progress have thinner markets. Their sales counts may be influenced by agricultural transfers, inheritance-related regularisation, family arrangements and limited local demand, while the largest urban markets are shaped more strongly by construction, migration, credit and metropolitan development. These mechanisms are plausible contextual explanations, not variables directly tested in the model.

Table No. 3. Largest territorial markets by total sales, 2017-June 2026

Rank	Territorial unit	Sales	Integral UAT exposure share
1	Bucharest	1,023,047	0.0%
2	Ilfov	430,631	7.7%
3	Cluj	314,697	16.8%
4	Timiș	304,854	20.0%
5	Brașov	297,983	9.2%

Rank	Territorial unit	Sales	Integral UAT exposure share
6	Constanța	248,094	32.1%
7	Iași	245,148	5.9%
8	Suceava	167,120	8.2%

Source: author's calculation based on NACLR sales files and the NCLRP Annex 1 at 30 June 2026.

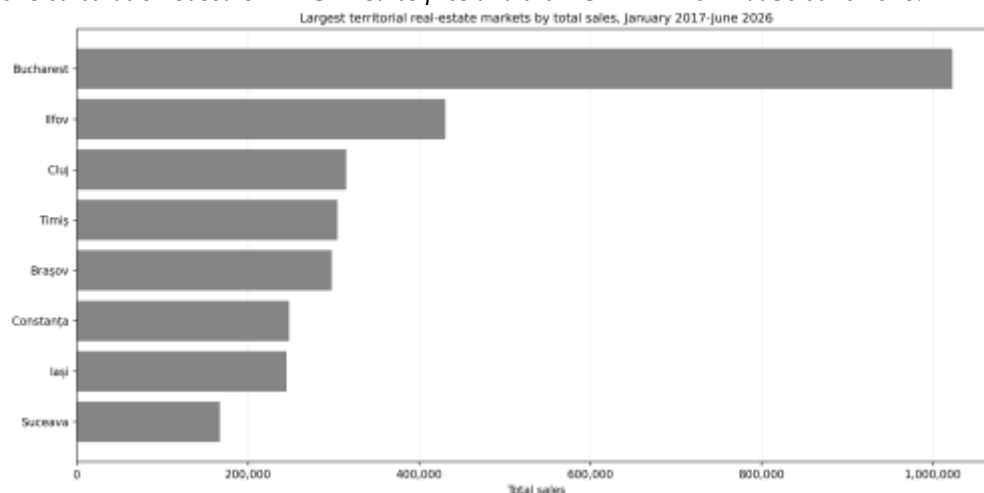


Figure No. 2. Largest territorial real-estate markets by total sales, January 2017-June 2026

6.3 End-period cadastral exposure and differential sales trends

The conservative extraction identifies 401 integrally completed ATUs, 3,896,194 land-book openings and 3,405,262.04 registered hectares at 30 June 2026. The broader ATU measure adds 91 partially completed ATUs, 713,185 land-book openings and 733,994.74 hectares. Both measures remain below the programme-wide finalised area because sector-level work inside non-completed ATUs is deliberately excluded. The descriptive scatter does not show a clear national pattern in which greater integral full-ATU exposure is associated with stronger growth in annual sales between 2017 and 2025 (Figure No. 3).

One possible interpretation is the structural difference between metropolitan and rural or semi-rural markets. In Bucharest, Ilfov, Cluj, Timiș, Brașov, Constanța and Iași, sales are strongly influenced by income, credit, construction, migration, student demand, tourism or peri-urban development. The major externally financed NCLRP component, by contrast, targets rural ATUs. In such localities, systematic registration may improve the legal conditions for transfer without creating new buyers where population, purchasing power or development demand remain constantly weak. The present data do not directly test that mechanism.

Accordingly, the absence of a robust positive county-level association should not be read as proof that cadastre lacks economic value. Registration may improve legal visibility, reduce future title risk and facilitate safer formal transfers even when the number of properties sold remains constrained by market depth. Legal formalisation and liquidity are related concepts, but they are not equivalent and are not measured by the same outcome.

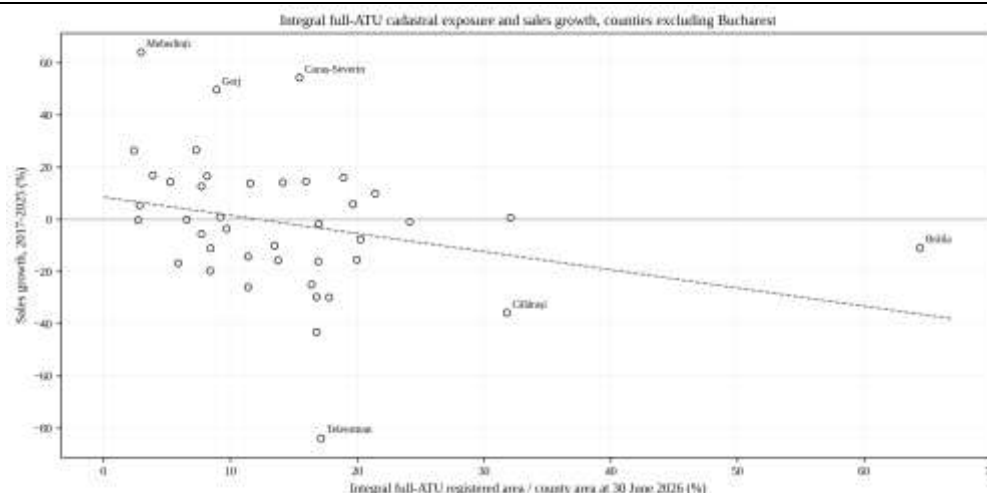


Figure No. 3. Integral full-ATU exposure and change in annual sales between 2017 and 2025, excluding Bucharest

Table No. 4 reports the exploratory estimates. In the baseline PPML model, the exposure $\times$ trend coefficient is -0.0104 ($p = 0.057$). The coefficient is negative in every reported specification. It reaches the conventional 5% threshold in the model that also includes the post-2023 interaction ($p = 0.040$) and in the broad integral-plus-partial exposure model ($p = 0.042$). However, it is statistically insignificant after excluding Bucharest ($p = 0.206$) and after excluding Bucharest and Ilfov jointly ($p = 0.199$); the negative-binomial GLM sensitivity check is also above the 5% threshold ($p = 0.062$). The evidence therefore does not support the hypothesised positive association, but neither does it establish a robust adverse cadastral effect. The sign and significance are sensitive to model and sample composition.

In the specification with an additional exposure $\times$ post-2023 term, that interaction is positive (0.0821) and narrowly misses the 5% threshold ($p = 0.051$), while the exposure $\times$ trend term becomes more negative. This pattern is suggestive only. The post-2023 period combines fiscal, monetary, inflationary and market changes, and cadastral projects were not allocated randomly across local conditions. The coefficients cannot support a claim that the fiscal amendment and systematic registration jointly caused a change in sales.

Table No. 4. Exploratory differential-trend estimates

Model	Term	Coef.	SE	p-value	exp(coef.)
PPML baseline - all units	Integral exposure $z \times$ trend	-0.0104	0.0054	0.057	0.990
PPML + post-2023 interaction	Integral exposure $z \times$ trend	-0.0223	0.0108	0.040	0.978
PPML + post-2023 interaction	Integral exposure $z \times$ post-2023	0.0821	0.0421	0.051	1.086
PPML - excluding Bucharest	Integral exposure $z \times$ trend	-0.0053	0.0042	0.206	0.995
PPML - excluding Bucharest and Ilfov	Integral exposure $z \times$ trend	-0.0055	0.0043	0.199	0.994
Negative-binomial GLM sensitivity ($\alpha = 1$)	Integral exposure $z \times$ trend	-0.0100	0.0054	0.062	0.990
PPML - integral + partial ATU exposure	Broad exposure $z \times$ trend	-0.0107	0.0053	0.042	0.989

Note: standard errors are clustered by county. The primary exposure uses the 401 integrally completed ATUs at 30 June 2026; the broad measure adds the registered areas of the 91 partially completed ATUs. Exposure is standardised and the trend is measured in years, so $\exp(\text{coef.})$ is the multiplicative annual trend ratio associated with one standard deviation more end-period exposure. Baseline $N = 4,788$; excluding Bucharest $N = 4,674$; excluding Bucharest and Ilfov $N = 4,560$. The endpoint exposure is cumulative and time-invariant; all coefficients are descriptive differential-trend associations, not causal treatment effects. The negative-binomial row is a GLM sensitivity check with α fixed at 1.

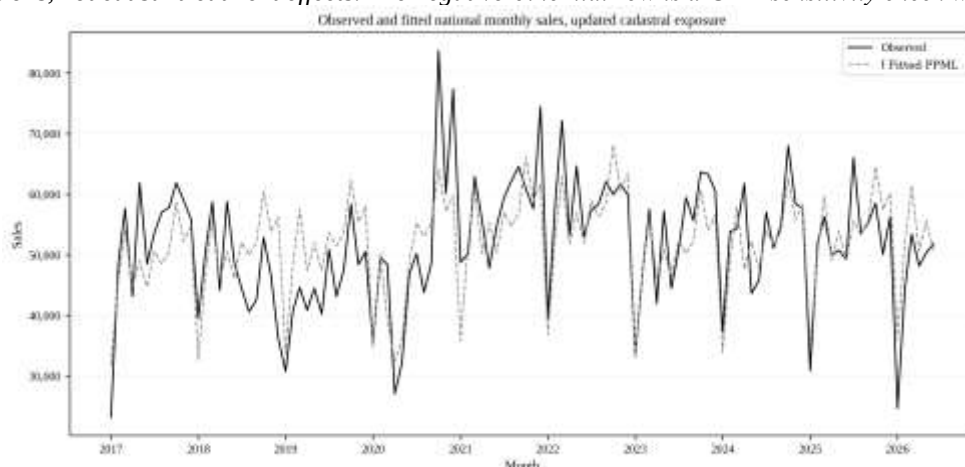


Figure No. 4. Observed and in-sample fitted national monthly sales under the baseline PPML specification

6.4 Potential public-revenue mechanisms

The econometric analysis does not estimate fiscal receipts. A formal real-estate transfer may nevertheless engage several legally distinct revenue channels: the tax regime applicable to transfers from personal patrimony, NACLRL tariffs for chargeable cadastral and land-register services, and taxable professional income generated by services such as notarial authentication or pre-purchase legal advice. These channels follow from the legal framework, but their magnitude cannot be inferred from the county sales counts used in this study.

Cadastral clarity may also increase fiscal visibility by making a transfer registrable and traceable within the formal system. This is a potential institutional mechanism rather than an empirical result of the present model. Transaction values, holding periods, exemptions, notarial fees and actual NACLRL or tax receipts are not observed; no fiscal yield is calculated.

7. Conclusions

The national analysis refines the institutional hypothesis without confirming a positive sales effect. Property certainty and legal protection remain essential conditions for market conduct, and cadastral registration identifies assets, records rights, supports public information and strengthens the visibility of real-estate relations. The 2017-June 2026 county-month estimates, however, do not show a robust positive association between end-period integral full-ATU exposure and sales trends.

This result does not imply that systematic registration is unimportant. Registration and market activity operate through different margins. Cadastral work may improve title certainty, opposability, future mortgageability and fiscal visibility even where credit, income, construction, demographic decline and local expectations continue to constrain the number of buyers. The programme's rural orientation also means that high measured exposure is partly concentrated in markets where formalisation and liquidity need not move together.

The June 2026 materials improve the measurement of the end-period cadastral stock. They distinguish 401 integral from 91 partial ATU completions and reveal the wider reach of sector-level work. The audited 401 integral ATU rows sum to 3,405,262.04 hectares and 3,896,194 land-book openings. The materials do not provide a complete monthly county chronology of completed hectares, sectors or ATUs throughout 2017-2026. They therefore strengthen descriptive

measurement without resolving the identification problem created by an end-period cumulative exposure.

The appropriate next step is an ATU-month or sector-month event-study design using the effective completion date of each intervention. Such a design should compare treated ATUs before and after completion with not-yet-treated or otherwise comparable ATUs, incorporate unit and month-year effects, test pre-treatment trends and distinguish among categories of immovable property. Until such data are available in a consistent machine-readable form, the defensible conclusion is limited: cadastral formalisation is necessary legal infrastructure for a modern property market, but its short-run transaction effect cannot be isolated causally with the present data structure.

8. Data and replication availability

The supplementary package prepared for the study contains the 492-row ATU extraction from Annex 1, the county-level exposure table, official June 2026 source documents, the published annual and territorial summary tables, the reported model coefficients, code for rebuilding the county-month panel and a reconciliation log. It records the use of the 401 ATU-row totals, including the discrepancy between one printed subsection total and its constituent rows.

The package does not treat schema-only files as populated observations. Exact re-estimation requires the complete set of 114 official monthly NACLR sales workbooks or the author's populated 4,788-row working panel. The reported estimates must therefore be read together with the data-availability limitation stated in the methodology.

The 2009-2016 workbook remains separate because it reports intabulations of principal real rights rather than the later monthly count of properties sold. Sector-level national totals are used descriptively and are not added to county exposure because the categories overlap and no complete county-month chronology is available.

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