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FROM THE EDITOR

Stepping beyond the confines of everyday life and tuning out the clamour of information, one is tempted to cry out: Spectres are haunting the world! Spectres of ...ism, ...ism, ...ism, and so on. For those familiar with the national literary canon, the words of Jaś from the play *The Wedding* ring out ever more clearly: ‘You had a golden horn, you lout [...] but all you’ve got left is a rope.’ Stanisław Wyspiański’s warning resounds not only in Poland, but all the more loudly in various parts of the world. In contemporary linguistic terms, Wyspiański’s message can be expanded into the idea that ‘there is ever-increasing uncertainty and it is becoming ever more difficult to assess risk’. This uncertainty affects both individuals and organisations, demanding an ever-higher level of resilience. Risk, meanwhile, is becoming increasingly difficult to assess, yet this is essential to the decision-making process. It is sometimes claimed that uncertainty is the fuel for creativity. Risk, however, does not tell us what will happen, but only what might happen. It is worth not only being aware of this, but also applying it proactively, as the maxim ‘it’ll all work out somehow’ – which is quite popular in Poland – risks leading to learning the hard way – let us hope not on a catastrophic scale.

In the hope that you will reflect on the message from the previous paragraph, we are pleased to present the 103rd issue of *Bezpieczny Bank*, which focuses on several challenges facing the financial sector – in regulatory, supervisory and analytical terms. The articles compiled in this issue highlight a wide range of issues faced by financial institutions amidst dynamic economic, technological and social changes.

In the ‘Problems and Opinions’ section, we present six articles addressing key issues for the stability and development of the financial system.

Marcin Bogusz analyses the architecture of development finance institutions and their links to the ‘sovereign-bank nexus’, highlighting the implications of this interdependence between the Treasury and the banking sector for economic policy and the state’s financial security.

Marta Penczar and Bartosz Lepczyński present a multidimensional analysis of the maturity of the mortgage market in EU countries, highlighting the variations in the level of development of this segment and its determinants.

Paweł Wajda addresses the issue of effective supervision of entities carrying out outsourced activities, drawing attention to the growing importance of outsourcing in the operations of financial institutions and the resulting supervisory challenges.

Krzysztof Iwanicki discusses the regulatory aspects of using machine learning in the validation of IRB models, presenting the positions of the EBA, the ECB and the Polish Financial Supervision Authority (KNF), as well as their implications for credit risk modelling practice.

Tatiana Einbacher analyses the phenomenon of forced intermediation in digital banking, highlighting its sources, scale and consequences for customers and financial institutions.

Paweł Kocoń presents a study on moral panic in the Polish banking sector, highlighting the mechanisms behind its emergence and its impact on the perception of financial institutions.

In the Miscellanea section, we publish a paper by Marcin Mrowiec and Marta Penczar, which provides a comprehensive assessment of the key risks to economic policy, the stability of the financial system and the credibility of the zloty. The authors highlight the most important risk factors that should be monitored by both public institutions and market participants.

We hope that the analyses and opinions presented in this issue will make a valuable contribution to the debate on the future direction of the financial sector and serve as inspiration for further research and discussion.

I invite you to contribute to future issues of Bezpieczny Bank and wish our readers an interesting read.

Jan Szambelańczyk
Editor-in-Chief

PROBLEMS AND OPINIONS

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The Architecture of Development Finance Institutions and the Sovereign-Bank Nexus: A Comparative Study of Poland, Germany and France

ABSTRACT

The study analyzed the process of public debt crowding out private credit activity, as a manifestation of the sovereign-bank nexus. The research covers three banking systems with different institutional models (France, Germany, Poland). In particular, it examined whether the identified patterns correspond to differences in the structure of public investment support. The verification was based on an unbalanced panel model with fixed effects for the period 1Q2018–2Q2025, including interaction variables identifying the effect separately for each country and using a robust variance-covariance matrix. The effect of public debt crowding out private credit activity is statistically significant in Poland and France, and not significant in Germany. However, formal tests of coefficient equality do not allow rejecting the hypothesis of their equality, which suggests a difference in the detectability of the effect rather than in its intensity. The findings are important for the resilience of the credit channel and sector stability.

Due to the number and specificity of the three systems studied, the conclusions are mainly of a hypothesis-generating nature.

Keywords: crowding-out effect, development finance institutions, sovereign-bank nexus, LSDV panel model, strategic investment bankability, first-loss instruments

JEL Codes: E51, G21, G28, H63, H81

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INTRODUCTION

The Polish economy faces urgent and capital-intensive investment challenges related primarily to the defence industry, the energy transition and the modernisation of infrastructure. By 2040, expenditure on the energy transition alone may reach approximately PLN 2.7 trillion (National Energy and Climate Plan, NECP) under the WEM (with existing measures) scenario. This amount exceeds the capacity of budgetary resources, particularly amid a deepening deficit. Given the shallowness of the domestic capital market, the main burden of mobilising funds for strategic investments¹ must be borne by bank financing.

The classical crowding-out effect (Elmendorf and Mankiw, 1999; Laubach, 2009, p. 858) posits that fiscal expansion raises market interest rates, thereby displacing private investment. The approach adopted in this study concerns not the price channel but a quantity-based balance-sheet substitution akin to financial repression (Becker and Ivashina, 2014, pp. 12–13), that is, a process in which banks shift their assets from corporate credit to sovereign debt. This mechanism is strongly conditioned by the balance-sheet architecture of the sector and by the nature of the linkages between banks and the sovereign (the sovereign-bank nexus). Hauner (2009) and Kumhof and Tanner (2005) show that when public debt accounts for a high share of assets, the effect is directly substitutive and bypasses the interest rate channel. Becker and Ivashina (2014) document measurable crowding out of corporate credit in the euro area in 2010–2013, particularly in countries with high fiscal risk. Popov and Van Horen (2015) describe its strong cross-sectional heterogeneity, while Broner et al. (2014) demonstrate that under fiscal shocks domestic banks become preferred purchasers of sovereign debt.

The existing literature, however, focuses on identifying the effect within homogeneous regulatory areas (the euro area) or analyses advanced systems separately, without systematically examining the extent to which the public support architecture, understood as an integrated system of development banks and funds, moderates the magnitude of this effect. In particular, comparisons of systems with different architectures (the wholesale model vs. the risk-absorption model) within a unified analytical framework typical of econometrics are lacking.

The aim of the article is to examine whether the crowding out of private credit by public debt is empirically detectable in three systems with different institutional models (Polish, German and French), and whether the pattern of its detectability can be identified in light of differences in the support architecture. Given the selection of the systems studied and their small number ($N = 3$), the study takes the form of a pilot comparative study with a hypothesis-generating function. It is assumed that the specific features of the Polish architecture, combined with an asymmetric regulatory-tax wedge, may favour a measurable, supply-side crowding-out effect, whereas the integrated Western European systems possess instruments that neutralise this

¹ At the same time, the category of strategic investments requires modification. Above all, it is evolving from an instrument of infrastructure policy into a tool integrating economic objectives with national security, assessed not only through the prism of return on capital (IRR) but also in terms of its capacity to strengthen resilience and reduce external dependencies.

effect at source. This assumption gives rise to two hypotheses. (H1) In the Polish banking system, the supply-side crowding-out effect is statistically significant and directionally robust. (H2) The pattern of detectability is consistent with the structural properties of the support architecture. The model covers the aggregate supply of corporate credit rather than structured finance volumes in the strict sense. This approach rests on the assumption that if an institutional system fails to protect standard corporate credit from banks' arbitrage in favour of Treasury bonds, it also exhibits a structural inability to absorb risky transformational megaprojects. The macroeconomic crowding-out effect is an aggregate manifestation of the same barriers that, at the micro level, prevent individual projects from reaching financial close. The article consists of six parts. The first addresses the bankability barrier, the second compares the support architectures in France, Germany and Poland, the third is devoted to the panel model together with the results and robustness tests, and the subsequent ones present the conclusions, recommendations and limitations, followed by the concluding remarks.

1. BARRIERS TO THE BANKABILITY OF STRATEGIC INVESTMENTS FROM THE PERSPECTIVE OF THE BANKING SECTOR

An analysis of the banking sector's involvement in financing the transition requires abandoning the perception of credit institutions as passive providers of liquidity, since they operate under a regime of stringent capital, regulatory and fiscal constraints. The bankability of strategic projects is therefore not their inherent attribute, but the resultant of the project's risk profile and of the private sector's capacity to absorb that risk without breaching internal prudential requirements.

1.1. The regulatory-tax wedge as a driver of arbitrage

The fundamental macro-financial barrier is the structural 'regulatory-tax wedge', arising from the accumulation of capital adequacy requirements and asymmetric fiscal burdens, which raises the opportunity cost of allocating capital to the real economy. In the Polish system, the design of the tax on certain financial institutions is crucial. The statutory exclusion of Treasury securities from the tax base creates a strong incentive for balance-sheet arbitrage. At the same time, stringent capital requirements create systemic pressure to reduce risk-weighted assets. Gropp et al. (2019, pp. 267–268) show in a quasi-natural experiment that banks subject to higher requirements respond primarily by curtailing lending rather than by raising capital. Seeking to optimise ROE (return on equity) under elevated fiscal burdens, the sector engages in rational substitution, that is, it reduces its exposure to capital-intensive, long-term transformational investments in favour of risk-free, liquid and untaxed public debt. The problem is compounded by the uncertainty of the legal environment and the need to build multi-billion-zloty provisions for risks in legacy portfolios, which erodes the Tier 1 capital base and lowers risk appetite (Risk Appetite Framework, RAF) in banking organisations.

1.2. Internal prudential filters and the Supervisory Slotting regime

The role of capital buffers as a mechanism filtering risk exposure is well documented empirically. Jiménez et al. (2017) show that a bank's capital position is a key determinant of its capacity and willingness to expand credit supply, with asymmetric effects. Capital constraints under stress conditions restrict credit supply disproportionately. Strategic investments (most often structured as project finance) that pass the initial compliance check against the RAF matrix face a sequence of prudential filters. The first structural barrier is concentration limits, in particular Article 395 of the CRR (Capital Requirements Regulation), which limits exposure to a group of connected clients to 25% of the bank's own funds; in systems dominated by state ownership, this blocks the financing of successive public megaprojects from the balance sheets of domestic institutions. The next filter is risk structuring at the *due diligence* stage, where the robustness of the cash flow model plays a fundamental role. In line with EBA guidelines, bankability requires demonstrating that debt service coverage ratios (including the DSCR) maintain safe buffers even under extreme stress scenarios (demand shocks, construction delays, interest rate increases). The exposure is further complicated by documentation and legal risk, including the need to implement fallback language in connection with the BMR (Benchmarks Regulation). The final barrier materialises at the credit committee stage under the Specialised Lending regime. Owing to the uniqueness of structured assets, which precludes standard estimation of the probability of default (PD), banks allocate capital using the Supervisory Slotting Criteria. If the state does not provide revenue-stabilising mechanisms (e.g. renewable energy auctions, availability payments in public-private partnerships (PPPs)) and does not absorb legal risk, the project is downgraded to the Satisfactory category (risk weight of 115%) or the Weak category (250%). Downgrading to the Weak category implies a capital requirement more than three times higher than for an exposure classified as Strong, which renders the transaction economically unjustified.

1.3. Integrated bankability requirements

In light of the above constraints, bankability conditions should be defined not as flexible commercial guidelines but as hard thresholds of balance-sheet tolerance. For a capital-intensive strategic investment to be financed on market terms, its contractual architecture must guarantee ring-fencing, complete closure of construction risk and the containment of administrative and legal risks at a level that allows them to be insured (e.g. policies of the Export Credit Insurance Corporation (KUKE)). The long maturities of financing for transformational projects (15–20 years) must be fully compatible with the bank's internal asset-liability management (ALM) constraints, funds transfer pricing (FTP) and structural liquidity ratios (net stable funding ratio, NSFR). The extent to which state development institutions are able to neutralise these deficiencies at the outset determines the effectiveness of the entire support system.

2. THE ARCHITECTURE OF PUBLIC INVESTMENT SUPPORT IN A COMPARATIVE PERSPECTIVE: GERMANY, FRANCE AND POLAND

The reference systems were selected using a purposive sampling strategy that maximises institutional variance. The selection criterion was institutional contrast, not statistical representativeness. The typology draws on Mertens, Thiemann and Volberding (2021), who identify two paradigms of public intervention in the EU, namely the model of wholesale liquidity stabilisation (Germany) and the model of centralised risk absorption (France). Germany and France were selected for four reasons. Both have the longest institutional tradition in Europe (KfW since 1948; Bpifrance since 2013, continuing a tradition dating back to the 1980s), enabling the observation of established transmission mechanisms. They represent two opposing variants of the same moderating variable, namely wholesale liquidity stabilisation and centralised risk absorption. They operate within a homogeneous regulatory regime (the euro area, the SSM (Single Supervisory Mechanism), common implementation of International Financial Reporting Standard 9 (IFRS 9)), which eliminates distortion of the results by regulatory differences. Finally, as the two largest euro area economies, both countries have considerably larger banking sectors than Poland. The larger scale of bank balance sheets implies a broader potential for substituting credit with sovereign debt, which makes them a more demanding testing ground for the hypothesis. The differentiation of the Western European models is deliberate, as it allows effects specific to the instruments (wholesale liquidity vs. risk absorption) to be distinguished from effects arising from the mere presence of an efficient system of development institutions. Poland, lacking both of these elements in an integrated form, serves as a natural control group.

2.1. The German model: wholesale liquidity stabilisation and the operationalisation of the Hausbankprinzip

The German architecture, structured around the Kreditanstalt für Wiederaufbau (KfW) group, is a classic example of a system of preventive, wholesale stabilisation of the credit market. In line with the ordoliberal paradigm of complementarity (German: Soziale Marktwirtschaft), the state does not substitute for market mechanisms but corrects their imperfections. Transmission occurs mainly through the liquidity and price channel, operationalised through the house bank principle (German: Hausbankprinzip). KfW does not enter into a direct relationship with the beneficiary; instead, acting as a liquidity aggregator, it issues bonds backed by a federal government guarantee (AAA rating), raising capital at the cost of sovereign debt, and distributes this cheap stream of long-term funding as preferential loans to commercial, cooperative and savings banks (the three-pillar structure of the sector), which take over the relationship with the investor and the initial risk assessment.

The German toolkit combines the provision of targeted liquidity through programme loans (German: Programmkredite) with partial assumption of the credit risk of the house bank (German: Haftungsfreistellung). The bank granting a programme loan refinances it with KfW,

and under the standard formula of the KfW-Unternehmerkredit programme, investment loans could have a maturity of up to 20 years with a fixed rate for the first 10 years (KfW Bankengruppe, 2020). This limits ALM mismatch risk, reduces pressure on the NSFR and LCR ratios and lowers the cost of funds transfer pricing (FTP). The scale of risk assumed depends on the programme and on economic conditions. Under the standard formula, KfW could, at the bank's request, release it from 50% of its liability (KfW Bankengruppe, 2020), whereas in the special programme launched in response to the pandemic the release amounted to 90% for SME financing and 80% for the financing of large enterprises, and for loans of up to EUR 3 million KfW waived its own risk assessment (KfW Bankengruppe, 2022). Since KfW's liabilities are covered by a statutory federal guarantee, exposures to KfW may receive a 0% risk weight under Article 116(4) CRR (KfW, 2024), while the release from liability reduces the house bank's risk-weighted assets in the protected portion. In targeted programmes, the toolkit is complemented by repayment grants (German: Tilgungszuschuss). Under programme No. 295, part of the loan is forgiven once completion of the investment has been demonstrated, and the forgiven amount is applied to the final instalments, which reduces the debt and shortens the loan term without changing the amount of the current instalments (KfW Bankengruppe, 2025). This architecture defines a channel through which the issuance of promotional debt stabilises credit supply and remains neutral with respect to lending to the real economy.

2.2. The French model: centralised absorption of non-linear risks

The French paradigm represents a different approach, oriented towards active market shaping (Mazzucato, 2013). It is characterised by a high degree of centralisation and integration of instruments within a single public entity, Bpifrance, which deliberately combines on a single balance sheet the competences of a development bank, a guarantee agency, an export credit insurer and a public equity fund (private equity/venture capital), which makes it unique. Bpifrance's main task is to assume technological risk (first-of-a-kind innovations), construction risk (CAPEX overruns) and early-stage risk, that is, non-linear and structural risks that the banking sector is unable to price reliably. The provision of senior debt is of secondary importance in its activities. The lack of historical data for novel investments prevents banks from reliably estimating PD, which places the transaction in the Supervisory Slotting regime with risk weights of 115% or 250%, significantly reducing ROE. Bpifrance addresses this problem through equity participation, subordinated (mezzanine) debt and first-loss tranches. By financing the pre-investment phase and taking the highest-volatility risk onto the public balance sheet, it improves the project's cash flow structure and raises the DSCR of senior debt. By the time the project reaches the credit committee, non-linear risk has already been ring-fenced, which allows the exposure to be classified as Strong (risk weight of 70% or 50%). The private sector can safely provide debt financing, as the state eliminates the regulatory wedge and minimises the propensity to reallocate towards government instruments.

2.3. The Polish model: fragmented governance and the transfer of systemic risk to the commercial sector

The Polish model of public support displays a reversal of the logic of the Western European systems. It is characterised by advanced fragmentation of governance and functional isolation of the key organisations (Bank Gospodarstwa Krajowego, the Polish Development Fund, the Export Credit Insurance Corporation). The absence of a coordinated offering for the banking sector means that the instruments operate in parallel rather than forming synergistic risk mitigation packages; bank consortia must assemble collateral on their own, incurring high transaction costs, which delays financial close and heightens decision-making uncertainty. The most important limitation is the functional asymmetry of the toolkit. Polish intervention is dominated by the paradigm of passively remedying the consequences of market failure (market-fixing; Mertens and Thiemann, 2018, p. 198), implemented mainly through *pari passu* guarantees that reduce conventional credit risk *ex post*. The range of instruments absorbing structural and non-linear risks is limited. Demand, technological and regulatory risks remain almost entirely unabsorbed by the state balance sheet. The consequence is ‘shallow bankability’. Public guarantees improve formal collateral ratios but do not remove the barriers embedded in bank balance sheets. Because the state assumes neither demand risk nor regulatory risk, systemic risk is transferred to the commercial sector. Cash flow models incorporating EBA stress-test assumptions then show a decline in DSCR buffers, and the unpredictability of the legal environment (highlighted in the NBP’s financial stability reports) leads credit committees to assign projects to restrictive Supervisory Slotting categories. Institutional dysfunctions overlap here with an asymmetric regulatory-fiscal wedge. Banks in Poland, obliged to maximise ROE and constrained by the concentration limits of Article 395 CRR, engage in rational asset substitution. The existence of the bank tax with a statutory exemption for Treasury securities triggers an arbitrage mechanism, encouraging banks to forgo transition financing in favour of safe, liquid and untaxed public debt (Becker and Ivashina, 2014, pp. 12–13). The institutional shortcomings of the Polish model thus become a supply-side determinant of the macroeconomic crowding-out effect.

A comparison of the regimes discussed suggests that the effective mobilisation of private capital is determined not by the mere presence of public development institutions, but by the degree to which their instruments are integrated with banks’ prudential requirements. This hypothesis forms the basis for the empirical verification in the following section. The differences come down to two axes. In the architectural dimension, the Western European models rely on deliberate coordination, that is, full centralisation in Bpifrance or a precise division of roles around KfW as a wholesale liquidity anchor, whereas the Polish model is an additive structure in which the overlapping mandates of BGK, PFR and KUKE lead to collateral-side constraints (a collateral bottleneck) and inter-creditor conflicts. In the instrumental dimension, France absorbs non-linear risks through subordinated debt (French: *prêts participatifs*) and first-loss components acting as quasi-equity, and Germany limits liquidity and funding cost risk through programme

loans refinanced by KfW on terms matching those of the loan granted to the investor; Polish *pari passu* guarantees, by contrast, leave demand risk, technological risk and early-stage risk, that is, the categories most difficult to absorb, on bank balance sheets. This explains the differing effectiveness of the credit supply channels. In the Western European models, the state uses instruments that relieve pressure on capital (RWA) and liquidity requirements *ex ante*, before the project enters the bank's internal credit assessment procedure, which makes it possible to maintain market discipline without blocking lending. In Poland, the absence of such a hierarchy of instruments means that the state intervenes selectively and at the end of the process, addressing only credit risk (guarantees) without resolving the bankability problem at source. Combined with the asymmetric regulatory-tax wedge, the unabsorbed systemic risk induces banks to shift capital towards sovereign debt.

3. PANEL MODEL AND ESTIMATION RESULTS

To verify the hypotheses, an unbalanced panel model was constructed for three banking systems (Polish, German and French, $N = 3$), comprising 88 quarterly observations (2018Q1–2025Q2). Only the Polish series retains the full time dimension ($T = 30$); the French and German series each comprise 29 observations owing to missing data. The 2018 threshold is not arbitrary: the entry into force of IFRS 9 (the expected credit loss (ECL) model) changed the methodology for impairment allowances and the reporting of NPL and CET1, and the inclusion of earlier observations would introduce a structural break in the variable definitions. Given the differing stochastic properties of the series and the need to eliminate spurious regression, volume variables were transformed into first differences of natural logarithms, and variables expressed in percentage points (CET1, NPL, reference rates) into first arithmetic differences, which is intended to ensure stationarity, stabilise variance and isolate cyclical variability. The GDP and GFCF variables were obtained directly as growth rates and therefore required no further transformation.

The data were obtained from ECB, NBP and KNF statistics (growth of lending to the non-financial sector and of Treasury bond portfolios); the EBA Risk Dashboard (CET1, NPL); Eurostat (GDP and gross fixed capital formation); and the ECB and NBP (reference rates).

The study employed the following panel model:

$$\begin{aligned} \Delta \text{Loans}_{i,t} = & \alpha + \rho \Delta \text{Loans}_{i,t-1} + \beta (\Delta \text{Bonds}_{i,t} \times D_{\text{Country}_i}) + \gamma_1 \text{GDP}_{i,t-1} + \gamma_2 \text{GFCF}_{i,t} + \\ & + \gamma_3 \Delta \text{CET1}_{i,t} + \gamma_4 \Delta \text{NPL}_{i,t-1} + \gamma_5 \Delta \text{Rate}_{i,t-1} + \gamma_6 \text{COVID}_t + \varepsilon_{i,t} \end{aligned}$$

where the individual symbols denote:

- $\Delta \text{Loans}_{i,t}$ – the growth of lending to the non-financial sector in country 'i' and quarter 't' (the notation with the index $t-1$ denotes the same variable lagged by one quarter; this convention applies to all variables in the model),

- α_i – individual fixed effects, which allow for control of unobservable, time-invariant structural characteristics of the banking systems studied. The individual fixed effects for Poland, in conjunction with the interaction parameter (β), absorb the long-term, structural impact of the local ‘regulatory-tax wedge’ (including the asymmetric bank tax and the costs of legal risk), eliminating the need to introduce a separate fiscal variable,
- ρ – the autoregressive parameter on the lagged dependent variable,
- β – the parameter measuring the magnitude of the crowding-out phenomenon, estimated for the interaction variable defined as the product of the growth of the Treasury bond portfolio ($\Delta \text{Bonds}_{i,t}$) and a dummy variable (D_{Country_i}) identifying a given institutional system,
- $\gamma_1, \dots, \gamma_6$ – parameters on the control variables, which are, respectively: GDP growth, growth of gross fixed capital formation (GFCF), the change in the Common Equity Tier 1 (CET1) ratio, the change in the share of non-performing loans (NPL), the change in the reference rate of the relevant central bank (the European Central Bank or Narodowy Bank Polski), and the binary variable COVID_t , taking the value 1 in quarters affected by the pandemic shock (2020Q1–2021Q2),
- $\varepsilon_{i,t}$ – the idiosyncratic error term.

Two-way fixed effects (TWFE) were deliberately not used, so as not to reduce the number of degrees of freedom excessively; any common macroeconomic shocks are absorbed by the reference rate control variable and the COVID dummy.

3.1. Choice of estimator and methodological justification

The parameters were estimated using the fixed-effects method in the form of least squares dummy variable (LSDV) estimation. The F-test against the pooled model (Pooled OLS) provided no formal grounds to reject the null hypothesis of zero individual effects ($F = 0.161$; $p = 0.852$); however, following the argument of Wooldridge (2010), when units are selected purposively rather than randomly, this test loses its decision-making interpretation. Since the systems analysed were deliberately selected as structurally distinct, the assumption that individual effects are independent of the regressors (which underlies RE (random effects) models) is theoretically unjustified; the deep heterogeneity of the markets therefore justifies the use of LSDV a priori, irrespective of the F-test result. The limited cross-sectional dimension ($N = 3$) rules out GMM (generalised method of moments) estimators, including Arellano-Bond, which are designed for panels with a large cross-sectional dimension and a short time series (large N , small T) and require the number of units to exceed the number of moment conditions; with $N = 3$ the GMM weighting matrix is singular. Under these conditions, LSDV was considered the most appropriate estimator. The inclusion of the lagged dependent variable generates a theoretical risk of bias (Nickell bias), which decreases in proportion to $1/T$ (Judson and Owen, 1999, pp. 11–12). This issue was verified using a parametric bootstrap bias correction (MacKinnon and Smith, 1998; Kiviet, 1995; Bruno, 2005) with 500 replications. The estimated bias of the autoregressive parameter was -0.048 (7.8% of the baseline value), consistent with

the analytical approximation (-0.056). Crucially, the Nickell bias has a negligible impact on the crowding-out parameter for Poland, as β_{PL} changes from -0.0925 to -0.0926 (by 0.07%), and the 95% bootstrap interval after correction [-0.151; -0.029] excludes zero. The parameter retains its significance and sign. The Nickell bias does not distort the conclusions.

3.2. Preliminary diagnostics

Stationarity testing was inconclusive at the level of the national series. The KPSS test yielded borderline results for Germany ($p = 0.086$) and France ($p = 0.064$), which, given the short series, reflects the limited power of the tests. The conclusion was based on the Maddala-Wu panel test, which allowed the unit root hypothesis to be rejected ($\chi^2 = 21.08$; $df = 6$; $p = 0.002$), substantially reducing the risk of spurious regression. The highest normalised values of the generalised variance inflation factor (GVIF), in the form $GVIF^{(1/(2 \cdot Df))}$, did not exceed 1.55, which rules out excessive multicollinearity.

3.3. Post-estimation diagnostics: endogeneity, autocorrelation, heteroskedasticity

A key stage was the assessment of endogeneity, in particular simultaneity bias between bond and credit dynamics. The Durbin-Wu-Hausman test in an instrumental variables model estimated by two-stage least squares (IV/2SLS; instrument: the first lag of bond growth) did not allow the exogeneity hypothesis to be rejected at the 0.05 significance level ($p = 0.073$); however, first-stage diagnostics revealed weak instruments (F below the Staiger-Stock threshold: 0.23–0.60), which deprives the test of power and disqualifies the IV/2SLS approach. The result should be interpreted as an absence of strong evidence of endogeneity rather than its exclusion, which justifies the return to LSDV. The negative relationship may also partly reflect a balance-sheet identity (reallocation as a single portfolio decision), which calls for caution in interpreting β as a purely causal effect. This caveat is general in nature and applies to all estimates presented below. The aggregate nature of the data and the short observation period allow inferences about co-occurrence and the direction of the relationship, but not about a causal relationship in the strict sense. Residual analysis revealed no grounds for rejecting the hypothesis of no autocorrelation in the error term (Breusch-Godfrey test, $p = 0.620$); therefore, given the detected heteroskedasticity (Breusch-Pagan test, $p = 0.016$), the final parameters were estimated with a robust heteroskedasticity and autocorrelation consistent (HAC) variance-covariance matrix in the Newey-West variant.

Table 1. LSDV panel model estimation results (dependent variable: $\Delta\text{Loans}_{i,t}$)

Explanatory variable	Coefficient (HAC standard error)
Baseline and control variables	
$\Delta\text{Loans}_{i,t-1}$	0.6215*** (0.1216)
$\Delta\text{CET1}_{i,t}$	-0.8463*** (0.2695)
$\Delta\text{NPL}_{i,t-1}$	-2.9246* (1.4728)
$\text{GFCF}_{i,t}$	-0.2088*** (0.0518)
$\text{GDP}_{i,t-1}$	-0.0247 (0.0482)
$\Delta\text{Rate}_{i,t-1}$	0.0527 (0.2482)
COVID_{-t}	-0.0036* (0.0021)
Interaction effects (crowding out)	
$\Delta\text{Bonds}_{i,t} \times \text{Germany}$	-0.0629 (0.0533)
$\Delta\text{Bonds}_{i,t} \times \text{France}$	-0.0488** (0.0223)
$\Delta\text{Bonds}_{i,t} \times \text{Poland}$	-0.0925*** (0.0316)
Model statistics	
Adjusted R^2	0.619
Number of observations (N $\times$ T)	88

Source: own elaboration. Note: Standard errors estimated using the Newey-West HAC robust matrix are given in parentheses. Significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The model includes estimated individual country fixed effects (separate intercepts), whose values are omitted from the table for clarity. The GDP and GFCF variables are expressed as annual growth rates (y/y) of quarterly observations and were therefore not additionally differenced, hence the absence of the Δ symbol.

3.4. Discussion of the estimation results

The estimation results (Table 1) indicate good explanatory power of the model (adjusted $R^2=0.619$), a typical value for differenced data. The control parameters are largely consistent with theory. The significant negative impact of CET1 growth (-0.8463***) is consistent with the finding that banks adjust their capital ratios by reducing risk-weighted assets rather than by raising capital (Gropp et al., 2019, pp. 284–285). An increase in the share of non-performing loans in the previous quarter ($\Delta\text{NPL}_{t-1} = -2.9246^*$) marginally restricts credit supply, although the parameter is unstable (it changes sign in the variant with third-order lags, L3). GDP growth and the lagged change in the reference rate proved insignificant. The pandemic variable is marginally significant and negative ($\text{COVID} = -0.0036^*$). Despite the support of the BGK, KfW and Bpifrance guarantee programmes, demand shocks translated, on net, into lower corporate credit

growth. The negative and significant association between investment expenditure and lending ($GFCF = -0.2088^{***}$) signals that the growth of investment in the period studied was not linked to an expansion of bank credit; possible explanations include a rising share of internal financing, market issuance or changes in the sectoral structure of investment. The aggregate nature of the data, however, precludes a definitive conclusion. This observation concerns investment undertaken in the period studied, largely replacement investment that could be financed from own funds. It does not, however, determine the sector's capacity to finance capital-intensive transformational projects whose scale rules out internal financing. This parameter disappears in the test with lagged GFCF ($\beta \approx 0.007$; $p = 0.903$), which calls for caution in causal interpretation; in the same specification, the crowding-out parameter for Poland retained its negative sign ($\beta_{PL} = -0.060$) with reduced significance ($p = 0.124$).

3.5. The crowding-out effect: analysis of the interaction parameters

The central element of the analysis is the evaluation of the crowding-out effect through the interaction parameters. The effect is statistically significant in Poland and France but insignificant in Germany. It should be noted, however, that this is a difference in the detectability of the effect rather than a statistically confirmed difference in its magnitude. This issue is resolved by the tests of coefficient equality discussed below. Before interpreting cross-country differences, it is necessary to establish whether the discrepancies in the point estimates are statistically significant. Wald tests of the equality of the interaction coefficients (with the HAC robust matrix) provided no grounds for rejecting equality in any pair, i.e. Poland-France ($F = 1.33$; $p = 0.252$), Poland-Germany ($F = 0.24$; $p = 0.628$), Germany-France ($F = 0.05$; $p = 0.816$), or jointly ($F = 0.67$; $p = 0.513$). The data are therefore consistent with a single common crowding-out parameter of the order of -0.06 to -0.07 , and the division into country-specific coefficients is not statistically justified. The lack of power to distinguish between them is a direct consequence of the narrow cross-section ($N = 3$) and the short series ($T \approx 29-30$). Since the specification includes a full set of interactions for the three countries without a stand-alone bond growth term, the β parameters have a direct marginal interpretation. An acceleration in Treasury bond portfolio growth of one percentage point is accompanied in the same quarter by a slowdown in lending growth of 0.09 percentage points in Poland and 0.05 percentage points in France. The estimates, however, differ in precision. The 95% confidence intervals based on HAC standard errors are $[-0.156; -0.029]$ for Poland and $[-0.093; -0.004]$ for France, compared with an interval more than twice as wide for Germany.

German banking system

The interaction coefficient proved statistically insignificant (-0.0629 ; $p > 0.1$). This result is consistent with findings from the sovereign debt crisis period, according to which banks in peripheral euro area countries increased their exposure to domestic public debt in response to rising country risk, which was not observed in core countries (Battistini, Pagano and Simonelli,

2014), and the transmission of sovereign debt market tensions to lending was concentrated in countries under fiscal stress (Altavilla, Pagano and Simonelli, 2017). The point estimate is, however, higher in absolute value than the significant French coefficient, and its insignificance stems mainly from low precision (standard error of 0.053 with $T = 29$). The wide confidence interval ($[-0.169; +0.043]$) does not allow the German effect to be distinguished either from zero or from the estimates for Poland and France. The absence of a detectable effect is consistent with the mechanisms discussed in Section 2 (the Hausbankprinzip, the three-pillar architecture), reinforced by the ECB's asset purchase programmes (the asset purchase programme, APP, and the pandemic emergency purchase programme, PEPP), which saturated the sector with liquidity.

French banking system

A moderate negative effect of bond purchases on lending was identified (-0.0488^{**} ; $p < 0.05$), reflecting the hybrid nature of the architecture. Bpifrance partly cushions shocks through equity instruments and first-loss tranches, but the highly consolidated, wholesale-market-oriented sector shows a propensity to substitute risky credit with liquid sovereign assets. The French result is, however, the least robust. It loses significance with L2/L3 lags and with lagged GFCF (where it changes sign), and the bootstrap confidence interval includes zero; its interpretation should therefore be formulated with caution.

Polish banking system

The interaction coefficient is significant and has the highest point estimate among the countries studied (-0.0925^{***} ; $p < 0.01$), although its difference from the French coefficient is not statistically significant. The result is consistent with the institutional diagnosis. Facing the concentration limits of Article 395 CRR and capital allocation under the supervisory slotting regime, and discouraged by the asymmetric regulatory-tax wedge, Polish banks shift capital from the corporate sector towards untaxed public debt, which confirms the thesis of the dysfunctional fragmentation of a model in which the state, as a passive guarantor, does not reduce structural risks at source.

4. CONCLUSIONS AND RECOMMENDATIONS

The nature of the study, which can be described as an exploratory comparative study of three systems, does not allow generalising conclusions to be drawn. The estimation results are consistent with the thesis that the state's capacity to mobilise private capital for strategic investments depends on the support architecture. In Germany, where a countercyclical model based on KfW and the Hausbankprinzip operates, no crowding-out effect was detected, whereas in Poland it proved statistically significant. The barriers arising from the sequence of prudential filters (the supervisory slotting regime, concentration limits under Article 395 CRR),

combined with the asymmetric regulatory-tax wedge, induce the sector to engage in arbitrage in favour of untaxed Treasury bonds. Closing the investment gap requires a shift away from linear forms of support towards advanced risk structuring techniques (de-risking) and the implementation of integrated subordinated mechanisms in two forms. First-loss funded instruments (subordinated debt or quasi-equity contributions from PFR) improve DSCR ratios under stress conditions; first-loss unfunded instruments (credit protection from KUKÉ or BGK) transfer demand risk from the bank's balance sheet to the public sector, optimising capital requirements and freeing up headroom within concentration limits. The implementation of these instruments must proceed in parallel with the evolution of the mandate of development institutions, from a passive guarantor towards an active market-shaping paradigm and close coordination of public capital, in which the coordinated action of BGK, PFR and KUKÉ would create a coherent point of contact for commercial banks. In the cases studied, it was the state, by assuming the role of investor of first resort at the early stages of the megaproject life cycle, that was able to stabilise their risk profile to a level acceptable within a standard banking risk assessment. This mechanism is consistent with the French model (Bpifrance); the above recommendations are, however, based primarily on the institutional analysis rather than on the difference in coefficients, the significance of which the data do not confirm.

4.1. Limitations of the study and directions for further research

The conclusions should be interpreted in light of the methodological limitations. One of the main limitations is the small sample size and the resulting lack of statistical power. The three-element set of systems analysed ($N = 3$) may limit the validity of the conclusions for a broader set of systems. Aggregate corporate credit growth served as a proxy for structured finance volumes (project finance), and the horizon covering 30 quarters from 2018 results from a structural change (IFRS9, finalisation of the CRR/CRD regime). The number of 88 observations for the systems studied results from the overlap of several constraints, namely the minimal set ($N = 3$), the 2018 structural break limiting the horizon, differencing of the series absorbing the initial observations and the dynamic specification with lags (the panel is also unbalanced, 29/29/30). Consequently, the standard errors of the key coefficients are large, particularly for Germany (0.053). The direct consequence is low statistical power with respect to the most important question, namely cross-country differences in the magnitude of the effect. Given the wide confidence intervals, the study does not distinguish effects of the order of -0.05 from -0.09 (joint test $p = 0.51$), so heterogeneity in the magnitude of the effect is a hypothesis rather than an empirical finding. What remains defensible, however, is (i) a measurable, directionally robust effect in Poland; (ii) its non-detectability in Germany; and (iii) the qualitative institutional-comparative analysis (the second and third parts of the article), which is independent of the power of the model. A natural direction for further research is a shift to micro-panel data from credit registers, which would increase identification power and enable an intra-organisational decomposition of risk aversion.

The stability of the results was subjected to sensitivity analysis across five specifications (baseline, with L2 and L3 lags, excluding the pandemic period, and with lagged GFCF). The crowding-out parameter for Poland retains a negative sign in all five specifications, and significance at the $\alpha=0.05$ level in three of them (baseline $p = 0.005$; L2 $p = 0.002$; L3 $p = 0.001$); it loses significance when the pandemic is excluded ($p = 0.108$) and with lagged GFCF ($p = 0.124$). The direction of the effect is stable, but its statistical strength depends on the specification and is most pronounced under abrupt supply shocks of public debt.

CONCLUSION

By combining institutional-comparative analysis with panel modelling, the study provides arguments that the dysfunctionality of the support architecture is a measurable, supply-side determinant of the crowding-out effect. It was not confirmed, however, that the effect differs systematically across institutional models, hence the caution in qualifying the results and describing them as hypothesis-generating.

The institutional analysis conducted in Sections 1 and 2 revealed crowding out as the resultant of the architectural properties of the systems rather than a simple consequence of fiscal expansion. The Western European models pre-emptively neutralise balance-sheet barriers *ex ante* (maturity mismatch in Germany, unquantifiable technological and demand risk in France, punitive risk weights under the supervisory slotting regime), whereas Polish *pari passu* guarantees, amid the siloed operation of BGK, PFR and KUKE, do not address these deficiencies, shifting risk onto commercial balance sheets. The empirical verification (LSDV, 88 observations) confirmed a significant effect in Poland and France, absent in Germany, but the tests of coefficient equality revealed no differences in its magnitude ($p = 0.51$). Hypothesis H1 was confirmed, with the caveat that the direction of the effect is stable across all five specifications, whereas statistical significance occurs in only three of the five. H2, by contrast, remains an interpretative framework requiring data with greater power.

The article combines two hitherto separate strands of research, namely the analysis of the sovereign-bank nexus and the assessment of the effectiveness of development finance institutions, within a unified econometric framework that accounts for the heterogeneity of the support architecture. The concept of an 'architecture for absorbing structural risks' as a variable moderating the crowding-out effect also introduces an analytical category that goes beyond conventional volume indicators (value of guarantees, number of projects) towards a diagnosis of the system's functional capacity to neutralise banks' balance-sheet barriers.

The results of the analyses have direct implications for the reform of the Polish support architecture and, at the European level, are consistent with the debate on deepening the Capital Markets Union (European Commission, 2020; Eurogroup, 2024) and on reforming the mandates of national promotional banks towards greater integration with prudential requirements; the

effectiveness of a Bpifrance-type model, posited on the basis of the institutional analysis, may serve as a point of reference for countries reforming their own instruments.

The Polish economy is entering a period of very high demand for transformational capital amid limited fiscal space. The study indicates that the banking sector's capacity to finance this transformation depends not only on macroeconomic and regulatory conditions, but also on the choice between passively remedying market failures and actively shaping conditions in which private capital can take on risks it could not bear on its own, in line with the concept of the entrepreneurial state (Mazzucato, 2013).

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A Multidimensional Analysis of the Maturity of Residential Mortgage Markets in the European Union Countries

ABSTRACT

The volume of housing loans relative to GDP indicates the importance of this segment of intermediation in a country's financial system. Properly analyzed, the market features of a given country – when compared with others – allow for an assessment of its level of maturity. At the same time, such an evaluation of the maturity of the housing loan market can roughly serve as an indication of the stability of the financial system in a given country or group of countries. Research on the characteristics and patterns of the maturation processes of housing loan markets in different countries is relatively scarce and methodologically challenging (among other things, due to heterogeneity).

The goal of the article is to analyze and quantify the maturity level of the housing loan market in 19 European Union countries. The analysis of the collected data used the TOPSIS technique, designed for a synthetic assessment of multi-criteria processes in the form of linear ranking of objects. Nine selected diagnostic indicators of the studied markets were analyzed. The diagnostic indicators of the examined markets and the results were used to create a ranking.

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Meanwhile, the indicators of basic features and the synthetic market maturity indicators were used to group the studied countries. The conducted analysis shows a clear segmentation of the mortgage markets in the examined EU countries according to the applied criteria and indicators, and thus provides evidence that the process of convergence of housing finance models in the European Union remains unfinished, while historical and institutional differences still significantly affect the development level of these markets. The highest positions were taken by Northern and Western European countries, characterized by a deep market, developed refinancing mechanisms based on covered bonds, relatively stable price conditions, and a significant share of fixed-rate loans. This pattern of results indicates that the maturity of the mortgage market is associated not only with the level of mortgage debt, but also with the durability of funding sources, the level of capital market development. At the bottom of the ranking were Hungary, Poland, Romania, Greece, Cyprus, and the Czech Republic.

Keywords: market maturity, residential mortgage lending, multidimensional analysis, TOPSIS method

JEL Codes: G21, F36, C38

INTRODUCTION

The real estate market plays a key role both in the national economy and in the lives of households (Ferrari & Loseto, 2023), affecting the level of investment, employment, and the financial stability of society (Feruś, 2024). It constitutes an important segment of the economy that influences the development of the construction, services, and financial sectors. An indispensable prerequisite for the dynamic development of the residential real estate market is a mature financial intermediation market, which enables the efficient financing of housing investments through the availability of mortgage loans¹ for households. A well-regulated and stable lending policy has a significant impact on the efficiency of the investment process and the liquidity of transactions, stimulating demand for residential property and increasing the purchasing power of households.

The initial research hypothesis assumes that the maturity of residential mortgage markets in the European Union countries is highly differentiated as a consequence of the unequal level of development of the elementary characteristics constituting the Synthetic Market Maturity Index (SMMI). At the same time, based on the review of the literature, it may be concluded that providing a universal explanation of the regularities governing the maturation processes

¹ In the article, we use three terms: residential mortgage loans, mortgage loans, and housing loans. In most European countries, a housing loan (i.e. a loan granted for residential purposes) is secured by a mortgage. However, there are also countries in Europe where guaranteed housing loans (backed by a third-party guarantee) account for a significant share of housing lending, while traditional mortgage loans secured by real property play a smaller role. France is a notable example. There, it is common for banks to accept a guarantee provided by a specialized guarantee institution that undertakes to cover the repayment of the loan in the event of borrower default, instead of relying primarily on a mortgage over the property.

of residential mortgage markets is highly complex, if not impossible. This results, among other things, from the specific and, importantly, evolving systemic context characterising individual markets or groups of markets.

The aim of this article is to provide a multicriteria assessment of the maturity of residential mortgage markets in 19 European Union countries. The structure of the article includes a critical review of the literature devoted primarily to the criteria and indicators used to assess the maturity of residential mortgage markets, while identifying a research gap concerning multicriteria analyses of such maturity. The originality of the article lies in the development of a multicriteria concept for assessing the maturity of the residential mortgage market and in the application of a selected analytical tool to construct a ranking of the maturity of the analysed markets. A separate section discusses mortgage interest rate formulas and the factors determining borrowers' choice of a particular interest rate formula. The choice between fixed-rate and variable-rate mortgage loans significantly affects the credit risk borne by households and, consequently, the stability of the entire residential mortgage portfolio, making this issue an integral component of the assessment of market maturity.

MATURITY OF THE RESIDENTIAL MORTGAGE MARKET

The issue of the maturity of residential mortgage markets remains insufficiently explored in the literature. Market maturity should be understood in relation to the level of development and stability of the mortgage market in a given country or region. By decomposing this concept, it may be concluded that it refers to the extent to which the market is developed in terms of its ability to satisfy the needs of both borrowers and lenders, the range of available products, and the overall efficiency and functioning of the market. The concept of market maturity should therefore combine both the aspect related to market development and that related to market stability.

The European Mortgage Federation adopts the ratio of outstanding mortgage debt to GDP as a measure of mortgage market maturity for the 28 European Union countries (Erol, 2019). This represents a one-dimensional approach, reducing the assessment solely to the size of the residential mortgage market relative to the size of the economy. However, an excessively high ratio of residential mortgage lending to GDP may signal an increased risk of destabilisation of the banking sector. Consequently, a one-dimensional approach to assessing market maturity is insufficient and should be complemented by additional criteria.

A. Bickova and E. Sierminska (Bicakova & Sierminska, 2008) argue that the maturity of the mortgage market depends, on the one hand, on the general legal environment (including contract enforcement, the effectiveness of the judicial system, collateral and bankruptcy regulations), as well as on the availability of credit information and information-sharing mechanisms, and, on the other hand, on the direct regulation of the mortgage market itself. The approach proposed by these authors is regulatory in nature and fits within the broader concept of market development.

The maturity of the residential mortgage market should also be analysed in the context of the market life cycle, encompassing the initial stage, the stage of dynamic growth, and the maturity stage. In this article, the market life cycle concept has been adopted as the analytical framework, deliberately departing from the classical product life cycle model, which assumes a linear and inevitable decline phase that is inappropriate for markets satisfying long-term social needs.

During the initial stage, the mortgage market begins to emerge, and mortgage loans are available only to a limited extent, usually to a narrow group of borrowers, such as high-income households. Credit risk is high, which leads banks to impose stringent down-payment requirements. At the early stage of development, banks rely primarily on traditional sources of financing, such as lending provided by state-owned banks or large commercial banks. At this stage, mortgage interest rates are usually high, while lending conditions remain relatively restrictive. The absence of appropriate regulations may pose threats to the stability of the financial system.

During the stage of dynamic growth, the mortgage market gains increasing importance. More diversified mortgage products become available, tailored to the different needs of consumers. Growing competition among banks contributes to a reduction in borrowing costs. An important feature of this stage is the development of the secondary mortgage market and financial instruments supporting the market, such as covered bonds. Mortgage brokerage also becomes an important distribution channel for mortgage loans.

A market may be regarded as having reached the maturity stage when it achieves stability and financial institutions offer a broad range of products tailored to different market segments. Mortgage products become widespread, diversified, and accessible to a broad group of consumers characterised by a high level of financial literacy. Borrowers make informed decisions regarding the choice between fixed-rate and variable-rate mortgage loans. The secondary mortgage market is well developed and enables banks to manage their mortgage portfolios efficiently. This means that mortgage loans, once originated, can be readily sold or securitised on the secondary market, allowing banks to recover capital quickly and reduce credit risk.

Table 1. Criteria and Characteristics of Residential Mortgage Market Maturity

Criterion	Definition	Potential Impact
Market size and penetration (market depth)	The size and accessibility of the market relative to the economy and households. This criterion makes it possible to assess the extent to which, under given macroeconomic conditions, a broad range of mortgage products is available, tailored to the different needs and financial capabilities of consumers, including fixed-rate mortgages, variable-rate mortgages, and government-supported mortgage loans.	Higher values indicate broader access to the residential mortgage market and a more extensive range of mortgage products.

Table 1. cont.

Criterion	Definition	Potential Impact
Sources and quality of funding	The structure of funding sources for residential mortgage lending in banks (deposits, bonds, covered bonds), taking into account their impact on long-term stability and resilience to market fluctuations.	A high share of covered bonds indicates stable, long-term funding.
Pricing conditions and competition	The level and structure of the cost of residential mortgage loans (including average interest rates and their variability), reflecting the intensity of competition among financial institutions and the efficiency of market mechanisms.	Lower average interest rates combined with low variability (standard deviation) indicate stronger competition and greater financial system stability.
Market saturation	The level of demand for housing finance, indicating the stage reached by the residential mortgage market in terms of its remaining growth potential with respect to new borrowers and mortgage lending dynamics.	A high level of market saturation may indicate greater availability of housing finance and a more developed financial sector; however, it may also reflect high household indebtedness and increased market vulnerability to changes in the business cycle and interest rates.
Consumer awareness and competencies	The level of financial literacy and the ability to make informed borrowing decisions, including the capacity to understand costs, risks (interest rate risk and exchange rate risk), and to compare competing market offers.	A higher level of financial literacy enables consumers to use mortgage credit responsibly, supports product innovation, and limits the risk of excessive household indebtedness.
Housing affordability and housing cost burden	The extent to which households can financially afford to purchase or rent housing, taking into account the relationship between housing costs and household income.	A deterioration in housing affordability may reduce demand and increase housing exclusion within society.
Importance of fixed-rate mortgages	The significance of fixed-rate mortgage lending within the residential mortgage market.	A larger share of fixed-rate mortgages may enhance household financial stability, reduce the risks associated with interest rate fluctuations, and decrease the vulnerability of the housing market to macroeconomic shocks.

Source: Authors' own elaboration.

The criteria presented above constitute a useful instrument for the multicriteria assessment of the degree of maturity of residential mortgage markets. Their combined application makes it possible to conduct a comprehensive analysis of market performance, identify its strengths and weaknesses, and compare the level of development of residential mortgage markets across countries and over time.

MORTGAGE INTEREST RATE FORMULA AND THE MATURITY OF THE RESIDENTIAL MORTGAGE MARKET

In research on the degree of maturity of residential mortgage markets, an important criterion is the diversity of the product offering with respect to lending conditions, particularly mortgage interest rate formulas. As experience has demonstrated, including recent developments in Poland, the interest rate formula affects not only borrowers' ability to service their debt obligations but also their attitudes towards contractual provisions, depending on changes in interest rates and the materialisation of risks associated with the mortgage loan. Consequently, under certain conditions, the interest rate formula may influence both the financial security of consumers and the stability of lending institutions.

For this reason, relatively extensive attention is devoted in this article to the issue of mortgage interest rate formulas. This follows from the adopted research approach, in which one of the dimensions of assessing the maturity of the residential mortgage market is the share of newly granted mortgage loans with an initial interest rate fixation period exceeding one year in the total value of new mortgage lending.

When deciding to take out a mortgage loan, a consumer must consider a number of factors affecting both the cost of borrowing and the timely repayment of debt. One of the key considerations is the choice of the interest rate formula, namely whether the loan will carry a fixed interest rate (fixed-rate mortgage, FRM) or a variable interest rate (adjustable-rate mortgage, ARM).

The European Mortgage Federation (EMF) distinguishes the following categories of mortgage interest rate formulas (European Mortgage Federation, 2024):

- variable-rate mortgages, with an initial interest rate fixation period of up to one year;
- short-term fixed-rate mortgages, with an initial interest rate fixation period between one and five years;
- medium-term fixed-rate mortgages, with an initial interest rate fixation period between five and ten years;
- long-term fixed-rate mortgages, with an initial interest rate fixation period exceeding ten years.

In the case of a fixed-rate mortgage (FRM), the interest rate remains unchanged throughout the entire loan term, providing the borrower with predictable instalments and protection against

the risk of rising interest rates. This type of financing is particularly beneficial for borrowers who prefer financial stability and during periods of low interest rates. However, fixed-rate mortgages usually involve a higher initial interest rate than adjustable-rate mortgages. As demonstrated by K. Ahn et al. (Ahn et al., 2022), borrowers choosing fixed-rate mortgages (FRMs) were willing to make payments that were 12% to 23% higher in order to avoid potential payment shocks associated with adjustable-rate mortgages, corresponding to variable-rate increases ranging from 0.66% to 1.62%.

By contrast, in the case of an adjustable-rate mortgage (ARM), the interest payable depends on the level of a reference rate (e.g., WIBOR or EURIBOR), which may change over time (Albertazzi et al., 2019), thereby affecting the amount of the loan instalment. This type of financing involves greater risk for borrowers because an increase in the reference rate leads directly to higher debt servicing costs. However, during periods of low or declining interest rates, adjustable-rate mortgages may offer more favourable borrowing conditions than fixed-rate mortgages. According to E. Berlinger (Berlinger, 2019), both fixed and variable interest rates involve risk. The choice between an ARM and an FRM therefore represents a trade-off between cash-flow risk and present value risk.

In many markets, including Poland, mortgage loans with temporarily fixed interest rates are also available, representing a compromise between FRMs and ARMs. Under such arrangements, the interest rate is fixed for a specified period, for example five to seven years, after which it is adjusted in accordance with prevailing market conditions and the applicable reference rate. This solution provides a certain degree of stability during the initial period of the loan while allowing borrowers to benefit from potential declines in interest rates in the future.

The consumer's choice of interest rate formula may also be influenced by the costs associated with the early repayment of the loan. In the case of adjustable-rate mortgages (ARMs), this issue is generally of lesser importance because the interest rate adjusts to current market conditions, and banks usually do not incur significant losses resulting from the early repayment of principal.

In the case of fixed-rate mortgages (FRMs), however, early repayment may have significant financial consequences for both the borrower and the lender. As noted by P. Mielus (Mielus, 2017), substantial changes in interest rates may lead to considerable fluctuations in the value of fixed-rate mortgage portfolios. When interest rates decline, borrowers frequently seek to refinance their loans on more favourable terms. This may result in losses for banks that originally granted the loans at higher interest rates, since early repayment deprives them of part of their expected future interest income.

To mitigate such losses and discourage borrowers from refinancing during periods of declining interest rates, banks may impose early repayment charges. The amount of such charges may depend on the difference between the interest rate applicable to the original loan and current market rates, as well as on the remaining maturity of the loan.

In many countries, regulations have been introduced to protect consumers against excessive costs associated with the early repayment of mortgage loans. These regulations include both specific rules governing the calculation of early repayment charges and limits on their maximum amount (European Central Bank, 2009, p. 27). In some legal systems, provisions have also been introduced requiring the gradual reduction of such charges over the life of the mortgage loan.

An analysis of empirical data for the European Union countries indicates substantial cross-country differences in the preferred mortgage interest rate formula. The structure of the mortgage market in this respect is determined by a number of factors, including macroeconomic conditions, the monetary policy of the central bank, the legal and regulatory framework, the level of inflation, and consumers' individual preferences.

Research conducted by the European Central Bank (2009) and J. Y. Campbell et al. (Campbell et al., 2013) demonstrates that clear differences exist across Europe in the dominant mortgage lending models. In countries such as Belgium, France, Germany, and the Netherlands, fixed-rate mortgages (FRMs) predominate, providing borrowers with stable loan instalments throughout the repayment period. The popularity of these loans results, among other factors, from banks' conservative lending policies, strong regulatory supervision, and a stable monetary policy that favours long-term fixed-rate borrowing.

By contrast, in markets such as Austria, Greece, Spain, Portugal, and Italy, adjustable-rate mortgages (ARMs) constitute the dominant lending model. This implies that consumers in these countries are more willing to accept the risk associated with fluctuations in interest rates, which may either reduce or increase borrowing costs depending on prevailing macroeconomic conditions.

It is worth noting, however, that consumers' choices have varied considerably across countries over time (Badarinza et al., 2018, pp. 2275–2288). The structure of the mortgage market with respect to the interest rate formula is not fixed but is subject to the influence of dynamic changes in the economic environment. Factors of particular importance include fluctuations in interest rates, the inflation rate, the correlation between unemployment and short-term interest rates, the financial literacy of households (Albertazzi, 2019), changes in the monetary policy of central banks, and regulatory reforms affecting the availability of different mortgage products. Furthermore, during periods of economic crisis or heightened financial uncertainty, borrowers may exhibit a stronger preference for fixed-rate mortgages in order to minimise the risk of increasing loan instalments. Conversely, during periods of stable or declining inflation, they may prefer adjustable-rate mortgages, expecting lower borrowing costs. Albertazzi U. et al. (Albertazzi et al., 2024) found that the share of newly originated fixed-rate mortgages is higher when the historical volatility of inflation is lower.

As a consequence, the structure of mortgage markets across Europe is continuously evolving, reflecting current economic trends, credit cycles, changes in monetary policy, and individual

consumer preferences. During periods of uncertainty and high interest rate volatility, consumers tend to favour fixed-rate mortgages, whereas in periods of low interest rates, adjustable-rate mortgages become more popular because they may offer lower borrowing costs in the short term.

The literature provides extensive analyses of the determinants of mortgage interest rate choice, taking into account both supply-side factors (decisions made by the banking sector) and demand-side factors (household preferences). Borrowers' decisions to choose either a fixed-rate mortgage (FRM) or an adjustable-rate mortgage (ARM) also result from a complex interaction between macroeconomic conditions, market regulations, and banks' lending strategies. Differences in borrowers' preferences are further explained by household characteristics, including income level, risk tolerance, financial literacy, and the time horizon of financial commitments. In countries characterised by higher levels of borrowers' financial literacy, stable economic conditions, and well-developed financial markets, fixed-rate mortgages are more prevalent. By contrast, in regions where short-term financing strategies predominate and greater flexibility in borrowing costs is preferred, adjustable-rate mortgages are more popular.

The study by M. Ehrmann and M. Ziegelmeyer (Ehrmann & Ziegelmeyer, 2017) identifies several macroeconomic conditions that increase the popularity of adjustable-rate mortgages. According to the authors, adjustable-rate mortgages are more likely to be chosen when:

the spread between long-term and short-term interest rates is high, implying that fixed-rate mortgages may initially be substantially more expensive than adjustable-rate mortgages, thereby making the latter more attractive to borrowers;

economic growth is strong, increasing households' willingness to assume greater financial risk in exchange for potentially lower borrowing costs in the short run;

the unemployment rate exhibits low volatility, making households more willing to accept the uncertainty associated with possible future increases in mortgage repayments.

The literature also emphasises the significant influence of central bank monetary policy on the choice between fixed-rate and adjustable-rate mortgages. By controlling policy interest rates, the central bank directly affects mortgage lending rates, and changes in monetary policy may encourage consumers to choose one interest rate formula over the other, depending on prevailing economic conditions.

It has been argued in the literature that a higher share of adjustable-rate mortgages in the economy strengthens the monetary policy transmission mechanism (Mishkin, 2007). This is because increases in mortgage repayments under adjustable-rate loans reduce borrowers' disposable income, thereby lowering household consumption and, consequently, inflation. This view is not, however, unequivocal. Research by F. Altunok et al. (Altunok et al., 2023) indicates that although higher mortgage repayments are unfavourable for borrowers, they

simultaneously generate higher interest income for banks. Consequently, under conditions of monetary policy tightening, banks with a larger share of adjustable-rate mortgages enjoy more favourable prospects for interest income, which may encourage them to expand the supply of such loans to a greater extent than banks with a lower proportion of adjustable-rate lending. Under these circumstances, the credit channel may partially offset the effects of higher interest rates, thereby reducing the effectiveness of monetary policy. A similar conclusion is reached by F. Core et al. (Core et al., 2025), who demonstrate that the effectiveness of disinflation depends not only on the magnitude of interest rate increases implemented by central banks but also on the manner in which those changes affect firms' behaviour. The monetary transmission mechanism includes a cost-based supply channel, whereby higher interest rates may lead to price increases in certain firms rather than to price reductions.

From the borrower's perspective, when the central bank raises interest rates in order to combat inflation or cool economic activity, the interest rates on adjustable-rate mortgages generally increase as well. Under such circumstances, consumers may prefer fixed-rate mortgages in order to protect themselves against future increases in borrowing costs. Fixed-rate mortgages provide stability of borrowing costs throughout the loan term, which is particularly valuable during periods of economic uncertainty when future monetary policy decisions are difficult to predict.

Conversely, when the central bank lowers interest rates, the cost of adjustable-rate mortgages declines, making them more attractive to borrowers. Falling interest rates may encourage consumers to choose adjustable-rate mortgages because they offer lower borrowing costs in the short run. Under such conditions, borrowers may expect further reductions in interest rates, making adjustable-rate mortgages a more advantageous financing option.

Moreover, consumers' decisions regarding the choice of mortgage interest rate formula are often based on their expectations concerning future changes in interest rates. If borrowers anticipate that the central bank will continue to raise policy rates, they may favour fixed-rate mortgages in order to "lock in" the interest rate at a favourable level. Conversely, if interest rates are expected to remain low or decline further, adjustable-rate mortgages may be perceived as the more advantageous option.

The above research findings indicate that the choice of mortgage interest rate formula is not merely a matter of borrowers' individual preferences but is strongly conditioned by macroeconomic circumstances, the structure of the financial market, and the policies pursued by banks and regulatory authorities. The dynamics of this choice change together with the economic environment, resulting in different lending models prevailing during different periods.

From the supply-side perspective, the determinants of mortgage interest rate choice stem primarily from banks' decisions regarding their funding structure, risk management, balance-sheet characteristics, competitive environment, and adaptation to regulatory and macroeconomic conditions (Sørensen & Lichtenberger, 2007). As financial intermediaries,

banks must strike a balance between profitability and the attractiveness of their mortgage products, resulting in differences in the availability of fixed-rate and adjustable-rate mortgages.

One of the key factors influencing banks' lending strategies is the cost of obtaining funding. When banks finance mortgage lending primarily through short-term deposits, they are generally more willing to grant adjustable-rate mortgages, since this enables them to better match funding costs with lending revenues. Conversely, when financial institutions are able to obtain long-term funding, for example through the issuance of mortgage-backed covered bonds or through mortgage securitisation, the supply of fixed-rate mortgages becomes more competitive.

Banks must also take interest rate risk into account. Fixed-rate mortgages expose banks to greater market risk because the interest rate cannot be adjusted during the term of the loan agreement to reflect prevailing market conditions. An increase in interest rates may result in a situation where the cost of funding exceeds the income generated from the outstanding mortgage portfolio, thereby threatening the bank's financial stability. To hedge against this risk, banks employ various strategies, such as the use of derivative instruments, which generate additional costs. Consequently, during periods of heightened uncertainty, banks may restrict the supply of fixed-rate mortgages or apply higher lending margins to compensate for potential losses.

Research conducted by U. Albertazzi et al. (Albertazzi et al., 2019) points to the dominant role of demand-side factors, which explain as much as 72% of the total variation in the share of fixed-rate mortgages in the total value of mortgage lending across the countries analysed.

The authors nevertheless emphasise the heterogeneity of the demand-side determinants influencing the choice of mortgage interest rate formula, which are generally intertwined with other factors. They demonstrate that the share of newly originated fixed-rate mortgages is higher when:

- historical inflation volatility is low, encouraging borrowers to seek stable financial solutions;
- there is a high correlation between unemployment and short-term interest rates, increasing the perceived risk of sudden changes in the borrowing costs of adjustable-rate mortgages;
- the level of household financial literacy is low, which may result in a preference for fixed-rate mortgages as more predictable and less complex financial products;
- regulations permit mortgage loans to be used as collateral for bank funding instruments, such as covered bonds and mortgage-backed securities (MBS), thereby supporting the availability of fixed-rate mortgages in banks' lending portfolios.

Consumers' choice of the interest rate formula for a mortgage loan is determined by a variety of factors that may be divided into two principal categories: factors related to the pricing of the mortgage product and factors associated with borrower characteristics.

The first group of factors relates directly to the cost of mortgage borrowing. When selecting a mortgage loan, consumers primarily evaluate the difference between the interest rates charged on fixed-rate and adjustable-rate mortgages, as well as their expectations regarding

future changes in interest rates. Research by M. Paiella and A. F. Pozzolo (2007) shows that in markets characterised by relatively high interest rates, borrowers tend to prefer adjustable-rate mortgages. This is because consumers anticipate that interest rates may decline in the future, thereby reducing mortgage borrowing costs and returning them to their historical average levels. Conversely, during periods when interest rates are widely expected to increase, consumers are more likely to choose fixed-rate mortgages because the stability of the interest rate provides a sense of security against future increases in borrowing costs.

The importance of pricing factors in the choice of mortgage interest rate formula is also emphasised by J. Vickery (2007). Examining the impact of changes in mortgage interest rates on consumer choices, the author demonstrates that an increase of only 20 basis points (0.2 percentage points) in the interest rate on fixed-rate mortgages leads to a 17-percentage-point decline in the market share of this type of loan. This finding indicates that consumers are highly sensitive to changes in interest rates, and that higher interest rates on fixed-rate mortgages increase the relative attractiveness of adjustable-rate mortgages, which may appear more appealing in the face of the higher cost of fixed-rate borrowing.

Factors related to borrowers' characteristics also play a crucial role in the decision-making process concerning the choice of mortgage interest rate formula. Income level, educational attainment, financial literacy, age, risk tolerance, as well as debt-to-value and debt-to-income ratios all influence consumers' preferences regarding the choice between fixed-rate and adjustable-rate mortgages.

Households with high incomes and substantial savings are more likely to choose adjustable-rate mortgages because they possess greater financial flexibility and are better able to absorb potential increases in mortgage repayments. As shown by the studies of E. Fortowsky et al. (2011) and J. R. Brueckner and J. R. Follain (1988), borrowers with larger financial reserves may deliberately assume the risk associated with interest rate fluctuations in anticipation of the potential long-term benefits resulting from lower borrowing costs. Conversely, lower-income households, as well as borrowers with limited financial literacy, are more likely to choose fixed-rate mortgages in order to avoid the risk of unexpected increases in loan repayments and the resulting difficulties in servicing their debt obligations. Research by B. Bucks and K. Pence (2008) demonstrates that households with lower incomes and lower levels of educational attainment exhibit greater sensitivity to interest rate changes and are more likely to experience financial distress when borrowing costs increase.

In general, comparative analyses of mortgage markets demonstrate that, as financial systems mature, the share of fixed-rate mortgages tends to increase. Their predominance results not only from the preferences of consumers seeking financial stability but, above all, from the ability of the financial system to transfer and distribute risk over the long term. This reflects a high level of development of the financial infrastructure (including the covered bond market and derivative markets), as well as a stable institutional environment that enables banks to offer

mortgage products with predictable funding costs. The predominance of fixed-rate mortgages is therefore not merely a practical solution for borrowers but also a symptom of market maturity, demonstrating the market's capacity to ensure stability and an efficient allocation of risk across the financial system as a whole.

RESEARCH METHOD

Assessing the maturity of European housing loan markets required the establishment of the criteria that constitute this concept. The selection of criteria was based on theoretical premises, the availability of comparable data, and the authors' research approach. The concept of housing loan market maturity adopted for the purposes of the study comprised criteria directly describing the degree of market development, as well as factors conditioning its maturity, such as the scale of the burden imposed on households by housing costs and consumers' awareness and competencies. Market maturity may be examined in two ways, namely from a static or a dynamic perspective. The static perspective consists in assessing the degree of maturity at a specific point in time, which enables comparisons across countries. The dynamic perspective, by contrast, treats maturity as an evolutionary process and focuses on identifying successive stages (phases) of market development and the mechanisms of transition between them, taking account of institutional, technological, regulatory, and macroeconomic changes. This study adopts a static approach. The research findings presented in the article should therefore be treated as a preliminary stage toward the construction of a comprehensive model of market development based on maturity phases.

The first criterion for assessing market maturity was the size and penetration of the housing loan market, referred to in the article as market depth. This criterion was described using indicators showing the value of housing loan debt relative to GDP and to households' disposable income. Indicators of this type are widely used in international comparisons. They make it possible to compare the size of housing loan markets and their importance in the economy. At the same time, high values of these indicators do not always reflect a higher level of market maturity in qualitative terms, since they may be the consequence of excessive household indebtedness or may result from an earlier credit boom. Subject to this limitation, for the purposes of comparative research it was assumed that higher values of these indicators indicate greater market maturity and are treated as benefit-type variables.

The second criterion for assessing maturity was the structure of mortgage loan funding and the linkage of this funding with the capital market. This criterion concerns the sources and quality of funding. To measure this aspect of maturity, an indicator showing the value of covered bonds outstanding relative to GDP was used. In mature systems, covered bonds are an important instrument for refinancing housing loans, supporting financial stability and the development of capital markets (Borkó et al., 2024). Relying on the development of the housing loan market

exclusively on deposit-based funding should be interpreted negatively from the perspective of housing loan market maturity, even if deposits are characterised by high stability and stickiness.

Two important arguments can be identified to justify including the covered-bonds-to-GDP indicator in the set of diagnostic variables describing market maturity. First, a higher value of covered bonds outstanding relative to GDP indicates a more developed capital market, which enables banks to obtain long-term and more stable funding. This limits credit institutions' dependence on short-term funding sources and reduces the risk of maturity mismatch between assets and liabilities. As a result, it is possible to offer mortgage loans with a longer fixed-rate period, which reduces borrowers' sensitivity to interest rate changes. Countries characterised by a high ratio of covered bonds to GDP more often offer fixed-rate mortgage loans because banks have long-term funding with predictable costs. In less developed markets, where funding comes mainly from deposits, variable-rate loans may play a more important role, which creates risk for borrowers in the event of an increase in interest rates. Consequently, the indicator of the value of covered bonds relative to GDP constitutes an important element in assessing the maturity of the mortgage loan market. Second, market maturity also implies greater diversification of funding sources. A higher ratio of covered bonds to GDP means that banks use more balanced (diversified) funding strategies that are better matched to the specific nature of housing loans.

The third criterion for assessing maturity was pricing conditions and competition. Two indicators were used to describe this criterion: the representative interest rate on newly granted housing loans and the standard deviation of interest rates, used to assess the stability of pricing conditions and the predictability of the debt-servicing cost. It was assumed that more mature markets are characterised not only by a lower level of interest rates, but also by greater interest-rate stability. For the purposes of the study, the standard deviation of housing loan interest rates was calculated over a fifteen-year period (2010–2024). Representative interest rates on new housing loans (annual average based on monthly data, in %) were adopted as the interest-rate indicator.

The fourth criterion for assessing maturity was the saturation of the housing loan market. To measure it, the value of housing loans per capita was used. A high value of this indicator may suggest that households' confidence in mortgage credit is high, which may indirectly indicate the maturity of society's financial culture.

The fifth criterion for assessing market maturity was consumer awareness and competencies. This criterion determines the manner in which available financial products are used, the capacity to assess risk, and the ability to select appropriate credit solutions. Because consumer awareness is not directly observable or easy to measure, an indirect indicator (proxy) was applied, referring to the level of consumers' financial knowledge in the countries under study. For this purpose, surveys conducted periodically by the European Commission were used. The proxy measure adopted was the percentage of respondents who correctly answered at least

four out of five standard questions testing basic financial knowledge, including, among others, understanding of interest rates, inflation, risk, and diversification. This type of measure is widely used in international research (e.g., OECD, World Bank, Standard & Poor's Global Financial Literacy Survey), because it makes it possible to capture, in a comparable and standardised manner, the degree to which households are prepared to make financial decisions.

The sixth criterion for assessing market maturity was the scale of the burden imposed on households by housing costs. For this purpose, the housing cost overburden rate was used, defined as the percentage of the population living in households in which total housing costs exceed 40% of disposable income. This indicator is important from the perspective of market maturity because it reflects the degree to which housing costs and financing conditions are aligned with households' income capacity and, consequently, indirectly indicates the real accessibility of mortgage credit. Low values of the indicator imply a greater capacity of households to service obligations on time, accumulate a down payment, and maintain creditworthiness, which supports the stable functioning of the housing loan market. Conversely, high values signal increased household sensitivity to income shocks and rising interest rates, increasing the risk of repayment arrears and deterioration in the quality of the mortgage loan portfolio. For this reason, the indicator should be treated as a cost-type variable.

The seventh criterion applied in the research on the maturity of housing loan markets in Europe was the criterion defining the role of fixed-rate loans in the market. The study assumed that a mature market is characterised by a greater share of fixed-rate loans in the overall volume and in new lending. This approach is justified by research findings showing that a higher share of fixed-rate loans reduces households' sensitivity to interest-rate shocks, stabilises the debt-servicing stream over the business cycle, and lowers the probability of a sharp increase in debtors' burdens under conditions of monetary policy tightening. To capture this criterion empirically, the indicator of the share of housing loans with an interest-rate fixation period longer than one year in the value of newly granted loans was used. This measure captures the current contractual structure of new lending.

Ultimately, nine diagnostic variables (CD1-CD9) were selected to conduct the multidimensional comparative analysis; together with the formulas for their calculation and the direction of interpretation (division into benefit-type and cost-type variables), they are presented in Table 2. Statistical data made available by HYPOSTAT and the European Commission were used in the research.

Table 2. Diagnostic indicators selected to assess the maturity of housing loan markets in the EU

Criterion	Indicator	Calculation formula	Interpretation of the diagnostic variable	Source of statistical data
Market size and penetration (market depth)	Outstanding residential loans to GDP ratio (CD1)	Value of outstanding residential loans (in EUR million) relative to GDP	Benefit criterion	HYPOSTAT data; data for 2024
	Outstanding residential loans to disposable income ratio (CD2)	Value of outstanding residential loans relative to households' disposable income	Benefit criterion	HYPOSTAT data; data for 2024
Sources and quality of funding	Mortgage-backed covered bonds outstanding to GDP ratio (CD3)	Value of mortgage-backed covered bonds outstanding relative to GDP	Benefit criterion	HYPOSTAT data; data for 2024
Pricing conditions and competition	Representative interest rate on new mortgage loans (CD4)	Representative interest rate on new mortgage loans (annual average based on monthly data, in %)	Cost criterion	HYPOSTAT data; data for 2024
	Standard deviation of representative interest rates on new mortgage loans (CD5)	Standard deviation of representative interest rates on new mortgage loans (annual average based on monthly data, in %)	Cost criterion	HYPOSTAT data; standard deviation calculated on annual data from 2010–2024
Market saturation	Outstanding residential loans per capita (CD6)	Value of outstanding residential loans per inhabitant	Benefit criterion	HYPOSTAT data; data for 2024
Consumer awareness and competencies	Financial knowledge (CD7)	Percentage of respondents who correctly answered 4 out of 5 questions testing financial knowledge	Benefit criterion	European Commission; 2023. The survey was conducted in March–April 2023

Table 2. cont.

Criterion	Indicator	Calculation formula	Interpretation of the diagnostic variable	Source of statistical data
Accessi- bility and housing cost burden	Housing cost overburden rate (CD8)	Percentage of the popula- tion living in households in which total housing costs (after deduction of housing allowances) exceed 40% of disposable income (also after deduction of housing allowances).	Cost criterion	European Com- mission/ Eurostat; data for 2024
Role of fixed interest rates	Share of gross residential lending with an inter- est-rate fixation period of over one year (CD9)	The value of gross resi- dential lending with an interest-rate fixation period of over one year as a share of total gross residential lending in a given year, ex- pressed as a percentage.	Benefit criterion	HYPOSTAT data; data for 2024

Source: Authors' own elaboration.

The criteria and indicators presented above were used to assess the degree of maturity of housing loan markets in 19 EU countries as at the end of 2024. The selection of countries was caused by the lack of a complete data set. The countries included in the analysis constitute the core of the European housing loan market, whereas the countries excluded from the study are characterised by a marginal share in the European housing loan market.

Assessing the degree of maturity of housing loan markets in European Union countries required the use of a tool capable of capturing the multifaceted nature of this phenomenon. Market maturity is not reducible to a single dimension; rather, it reflects the coexistence of a larger number of elements (criteria, indicators), which makes it a category that is not directly observable. For this reason, an approach based on methods of multidimensional comparative analysis was adopted². This enables the aggregation and transformation of many diverse partial indicators into one coherent synthetic measure that allows comparisons across countries. The literature emphasises that ‘the basic objective of multidimensional comparative analysis is the construction of a synthetic measure enabling the comparison of elements of a set (objects) described by many variables (features)’ (Bąk, 2013). ‘Methods of linear ordering are often used to achieve this objective’ (Bąk, 2013).

The study of the maturity of housing loan markets in the EU was based on the well-established TOPSIS method (Technique for Order Preference by Similarity to Ideal Solution) (Tzeng &

² The term statistical multidimensional analysis is also used (Gatnar and Walesiak, 2004).

Huang, 2011). The method was developed by C. L. Hwang and K. Yoon, who introduced it in 1981. Originally, TOPSIS was designed as a tool supporting multi-criteria decision-making (MCDM) problems (Kisielinska & Borkowski, 2022). The TOPSIS method is increasingly used in comparative studies (Bulgurcu, 2012). The original TOPSIS procedure (Dworniczak, 2012) was adapted to the needs of studying the maturity of mortgage loan markets. The analytical procedure consisted of six stages:

- 1) Construction of the decision matrix – a country-by-indicator matrix used to assess the maturity of housing loan markets.
- 2) Data normalisation – bringing indicator values to a common scale so that they are comparable.
- 3) Determination of the positive ideal solution (PIS) and the negative ideal solution (NIS) – the best and worst values for each indicator.
- 4) Calculation of the separation measures of the alternatives from both reference solutions.
- 5) Calculation of the relative closeness coefficient – the closer the value is to 1, the higher the alternative is assessed in terms of maturity.
- 6) Ranking of alternatives – ordering them from the best to the worst.

As a result of applying the TOPSIS procedure, a synthetic maturity indicator (SMI) was obtained, which made it possible to rank countries according to the level of maturity of the housing loan market.

The SMI value for a given country, interpreted as relative closeness to the positive ideal solution (PIS), is a natural consequence of the selection of diagnostic variables for the analysis and of the TOPSIS method itself. Thus, a change in the set of countries or diagnostic variables under study may affect the calculation results and the linear ordering of the alternatives. As a result of applying the TOPSIS method, a ranking of EU countries was obtained in terms of the maturity of housing loan markets.

No weights were applied to individual indicators in the analysis; instead, equal importance was assigned to all indicators in assessing the maturity of housing loan markets. This decision resulted from the fact that the literature does not provide unequivocal grounds for ranking the importance of individual aspects of market maturity. Introducing weights under such conditions could increase the arbitrariness of the assessment procedure and negatively affect the results of cross-country comparisons.

The zero unitarisation method was used to normalise the variables (Kukuła, 2000). 'The purpose of normalising features is to enable broad comparative studies of objects with respect to the level of many variables (features) adopted as criteria for assessing the complex phenomenon under consideration' (Kukuła, 1999). The following formulas were used to normalise benefit-type and cost-type variables (Kukuła, 2000). In the case of cost-type variables, the zero unitarisation procedure was applied, whereby variables with an undesirable direction of preference were

transformed into benefit-type variables and simultaneously normalised according to the following formula (Kukuła, 2000):

$$Z_{ij} = \frac{\max(x_j) - x_{ij}}{\max(x_j) - \min(x_j)}$$

where x_{ij} denotes the value of the j -th feature for the i -th country, while $\min(x_j)$ and $\max(x_j)$ are, respectively, the minimum and maximum values of this feature in the set of EU countries under study. As a result of the transformation, variables in the interval $[0,1]$ were obtained, with higher values indicating a more favourable assessment under a given criterion. For benefit-type variables, normalisation was carried out using the zero unitarisation method according to the formula:

$$Z_{ij} = \frac{x_{ij} - \min(x_j)}{\max(x_j) - \min(x_j)}$$

As a result of zero unitarisation, a normalised decision matrix was obtained and used in the subsequent stages of the TOPSIS method.

In the next stage, the parameters of the reference solutions were determined, and then the separation measure of the alternative – the housing loan market in country X belonging to the EU – from the positive ideal solution (PIS) and the negative ideal solution (NIS) was calculated. The Euclidean metric was adopted as the distance measure. Finally, for the market in country X, the SMI was calculated as the ratio of the distance of market X from the NIS to the sum of the distances of market X from the PIS and the NIS; it falls within the interval from 0 to 1. The value '1' characterises a mature market – one close to the positive ideal solution. By contrast, the value '0' characterises the least mature market.

Several arguments support the selection of the TOPSIS method for the study. TOPSIS makes it possible to take into account a larger number of criteria simultaneously, regardless of their scale and direction of preference, which increases the objectivity of classification and limits arbitrariness in selecting the weights of individual criteria. In addition, it allows the precise determination of the separation of each market from the positive ideal solution and the negative ideal solution, which facilitates the construction of rankings and the identification of markets with a similar degree of maturity. In the TOPSIS method, the housing loan market in the EU countries under study is assessed with reference to two reference solutions that constitute the basis of evaluation, i.e., the positive ideal solution (PIS), representing a hypothetical state in which all analysed indicators reach the most desirable values, and the negative ideal solution (NIS), representing the opposite case. This property distinguishes the TOPSIS method from the Hellwig method commonly used in Polish studies (Hellwig, 1968), in which the synthetic assessment is based on the relation of an object to a positive development pattern. For this reason, TOPSIS is a particularly useful tool for multi-criteria comparisons and the construction of rankings of markets with a similar degree of maturity.

The method discussed belongs to the class of linear ordering methods, which enable the ordering of analysed objects (e.g., housing loan markets) on a one-dimensional scale with an unambiguous interpretation, although originally it was a method supporting multi-criteria decision-making (Hwang & Yoon, 1981). The main advantages of linear ordering methods include simplicity of interpretation and ease of comparisons between objects. However, this approach entails certain limitations. These methods assume the linearisation of a multidimensional feature space, which enables the construction of an unambiguous ranking but at the same time leads to the loss of information about nonlinear relationships between indicators and to the omission of threshold effects and specific interactions between criteria.

In summary, the approach based on the TOPSIS method is a useful solution, although not without limitations, because on the one hand it allows a comprehensive assessment of the maturity of mortgage loan markets while taking into account their multidimensional nature, but on the other hand the results depend on the normalisation scheme and the weighting scheme adopted for individual indicators.

DESCRIPTION OF RESEARCH RESULTS

The first element of the study was the construction of a matrix of countries and indicators used to assess the maturity of housing loan markets. The values of the indicators included in the study are presented in Table 3.

Table 3. Values of diagnostic indicators of housing loan market maturity in 19 EU countries

Country	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8	CD9
Austria	27.0	42.5	19.8	3.89	0.80	14,194	28	6.3	76.9
Belgium	52.8	89.7	9.1	3.41	0.86	27,418	30	6.7	92.9
Cyprus	25.3	43.5	1.9	4.70	1.24	8,783	19	2.4	48.4
Czechia	21.4	40.6	4.7	5.16	1.27	6,271	25	9.2	93.2
Denmark	70.2	150.0	109.8	4.73	1.30	46,750	40	14.6	61.3
Finland	38.3	65.6	17.9	3.99	1.13	18,873	40	5.4	3.8
France	43.9	68.0	12.9	3.41	0.97	18,741	25	7	96.0
Germany	43.9	71.2	6.9	3.80	0.97	22,665	32	12	88.2
Greece	11.4	17.5	4.1	4.06	0.55	2,595	19	28.9	70.4
Hungary	7.5	12.4	2.5	7.28	2.48	1,612	22	9	99.8
Ireland	15.5	52.1	2.4	4.04	0.38	15,419	31	4.5	69.5

Table 3. cont.

Country	CD1	CD2	CD3	CD4	CD5	CD6	CD7	CD8	CD9
Italy	19.4	30.6	7.3	3.11	1.00	7,228	25	5.1	88.6
Netherlands	78.5	159.9	19.7	3.93	1.01	49,609	43	6.9	84.3
Poland	13.7	23.4	0.4	7.65	1.70	3,169	20	5.2	78.1
Portugal	36.5	55.9	13.9	3.67	1.11	9,785	16	6.9	78.0
Romania	6.3	12.4	0.0	6.44	1.01	1,161	13	4.7	68.0
Slovakia	31.1	50.9	11.4	4.42	1.50	7,512	27	6.4	95.0
Spain	29.8	49.0	11.7	3.35	0.72	9,759	19	7.8	87.7
Sweden	82.8	172.8	39.9	4.14	1.06	44,230	34	10.6	15.0

Source: Authors' own elaboration based on HYPOSTAT and European Commission data.

In 2024, the ratio of the value of housing loans outstanding to GDP (CD1) in the analysed group of 19 EU countries was characterised by high heterogeneity. This indicates varying degrees of development of these markets and their role in the economies of the EU countries under study. The mean value of the indicator was 34.49%, while the median stood at 29.8%. Dispersion was substantial, as the standard deviation amounted to 22.97 percentage points and the coefficient of variation stood at 66.61%, confirming the strong differentiation of the population under study. The highest values were recorded in the Scandinavian countries and the Netherlands, while the lowest occurred in Central and Eastern European and Southern European countries (Romania, Hungary, Greece).

Poland, with an indicator of 13.7%, was placed in the lower part of the group of countries under study. An analysis of Hypostat data shows that in 2015–2024 Poland's distance from the EU-27 average did not decrease but slightly widened (the gap increased from approx. 23.2 percentage points in 2015 to 24.6 percentage points in 2024). This means that after a period of growth in the indicator in the first half of the previous decade, the convergence process weakened.

The stability of this indicator over time was also assessed in the group of countries under study³. The analysis covered the years 2001–2024. The results obtained indicate that mortgage loan markets in the countries under study developed asynchronously and were subject to strong cyclical shocks. In Central and Eastern European countries, the pattern of catching up from a low initial level dominated; however, in recent years stabilisation or a decline in the indicator has been observed more often, which may reflect a limitation of new lending and the impact of changes in nominal GDP.

³ The stability of the indicator was assessed by analysing the variability of its trajectory over time in 2001–2024, in particular on the basis of the standard deviation and coefficient of variation calculated for individual countries, supplemented by an assessment of turning points in crisis periods.

In 2024, the ratio of the value of housing loans outstanding to households' disposable income (CD2) in the analysed group of 19 countries was also characterised by very high variability. The mean value was 63.58%, while the median was 50.9%, which indicates a right-skewed distribution. Dispersion was substantial, as evidenced by the standard deviation of 47.98 percentage points. The coefficient of variation was 75.47%, confirming the strong heterogeneity of the group of countries under study.

In 2024, the indicator of the value of mortgage covered bonds outstanding relative to GDP (in %) (CD3) also varied strongly across the countries under study. The mean was 15.59%, while the median was 9.1%, which indicates a strongly right-skewed distribution. The coefficient of variation was 158.47%, confirming that the level of development of the covered bond segment differs radically across countries. In general, Europe features the coexistence of countries in which the mortgage covered bond market is of marginal importance (almost close to zero) and a few economies where it is a key instrument for refinancing mortgage loans.

In 2024, the interest rate on newly granted housing loans (annual average, in %) (CD4) in the analysed group of countries averaged 4.48%, with a median of 4.04%. The differentiation in the level of interest rates was moderately high. The standard deviation was 1.30 percentage points and the coefficient of variation was 28.91%. At the same time, the extreme values ranged from 3.11% to 7.65% (range of 4.54 percentage points), indicating the coexistence of markets with relatively moderate financing costs and markets with significantly higher credit costs for consumers.

Interest-rate volatility in the long term, measured by the standard deviation over 2010–2024 (CD5), points to significant differences in the stability of pricing conditions across the analysed countries. The mean value of this measure was 1.11 percentage points, while the median was 1.01 percentage points, suggesting that in a 'typical' country under study, interest-rate fluctuations in the analysed period oscillated around approx. 1 percentage point. However, the range of values was broad (0.38–2.48 percentage points; range of 2.10 percentage points), indicating that, alongside markets with relatively stable pricing conditions (standard deviation of approx. 0.5–0.7 percentage points), there were also countries with distinctly greater volatility, reflecting a less predictable interest-rate environment.

In 2024, the indicator of the value of housing loans per capita (CD6) in the group of EU countries under study was characterised by very large variation (from EUR 1,161 to EUR 49,609), which would indicate the coexistence of markets with marginal credit saturation and economies with a very high scale of housing indebtedness per inhabitant. The highest values were recorded in highly developed countries, whereas in some of the countries under study the indicator did not exceed several thousand euros. Poland (EUR 3,169) was placed in the lower part of the distribution, indicating a relatively low level of saturation of the housing loan market per inhabitant.

Consumers' financial knowledge was assessed using the percentage of respondents who correctly answered at least 4 out of 5 questions testing basic financial knowledge (CD7). It was assumed that a higher value of the indicator means a higher level of competencies and thus (in qualitative terms) greater maturity of the demand-side environment of the housing loan market. The mean percentage of such respondents was 26.7%, with a median of 25%. Variation was moderate (standard deviation of 8.5 percentage points). Analysis of the indicator using descriptive statistics tools points to the coexistence of countries with relatively high financial awareness ($\geq 40\%$) and countries with clear deficits ($\leq 16\%$), which may limit the 'qualitative' maturity of the market through households' weaker capacity to assess the costs and risks associated with taking out a housing loan.

The housing cost overburden rate (CD8), defined as the percentage of the population living in households in which total housing costs exceed 40% of disposable income, in 2024 was characterised by substantial variation in the analysed group of 19 countries. The mean value of the indicator was 8.40%, while the median was 6.9%, which indicates a right-skewed distribution. Dispersion was relatively high, as the standard deviation was 5.58 percentage points and the coefficient of variation was 66.38%. This means significant heterogeneity of the population of countries under study in terms of the scale of the burden placed on households by housing costs.

The final indicator included in the study was the share of fixed-rate housing loans in newly granted housing loans in the analysed countries (CD9). The mean value of the analysed indicator was 73.43%, with a standard deviation of 26.20 percentage points and a coefficient of variation of 35.68%. This means that in 2024 there was high differentiation of the indicator among the EU countries under study. It may be concluded that the share of fixed-rate loans was a strongly differentiating feature of the population of countries under study. It may therefore be regarded as a diagnostic variable that is analytically useful in comparative studies on the maturity of housing loan markets in the EU.

In accordance with the analytical procedure presented earlier, in the subsequent steps the data were normalised, the positive ideal solution (PIS) and the negative ideal solution (NIS) were determined, and then relative closeness coefficients were calculated. On this basis, the countries under study were ranked in terms of the level of maturity of the housing loan market.

Table 4. Synthetic maturity indicator and ranking of housing loan market maturity in 19 EU countries according to data as at the end of 2024⁴

Countries	SMI	Ranking
Netherlands	0.730	1
Denmark	0.730	2
Sweden	0.642	3
Belgium	0.609	4
France	0.555	5
Germany	0.552	6
Ireland	0.514	7
Austria	0.513	8
Finland	0.501	9
Spain	0.498	10
Italy	0.490	11
Slovakia	0.479	12
Portugal	0.476	13
Czechia	0.436	14
Cyprus	0.420	15
Greece	0.377	16
Romania	0.362	17
Poland	0.348	18
Hungary	0.339	19

Source: Authors' own elaboration.

The SMI values were subjected to descriptive statistical analysis involving the calculation of the mean and standard deviation, which made it possible to characterise the differentiation of the maturity of housing loan markets in the group of EU countries under study. The mean value of the SMI scores obtained was 0.504, while the standard deviation was 0.115. The SMI ranking obtained as a result of applying the TOPSIS procedure indicates clear segmentation of European housing loan markets, because the values of the indicator form clusters enabling the identification of several relatively homogeneous groups of countries. It is also worth highlighting

⁴ For measure CD7, data from 2023 were used.

the interpretative limitations of the TOPSIS-based indicator. In the study, it can only be inferred that the housing loan market of country A is, in terms of maturity, closer to the PIS and farther from the NIS than the market of country B, whereas the adopted research method does not warrant the statement that the housing loan market in country A is, for example, 0.10 units more mature than in another country under study.

On the basis of the research conducted, four relatively homogeneous groups of countries can be distinguished, differing in the configuration of the features that constitute housing loan market maturity.

The first group comprised countries with the highest values of the synthetic measure (value range from 0.642 to 0.731). This group included the Netherlands, Denmark, and Sweden. The group under discussion stands out from the others due to the very high depth of the housing loan market, as evidenced by high levels of the ratios of housing loans to GDP and to disposable income. A notable feature of these countries is also the significant role of the covered bond market in refinancing housing loan portfolios.

The second group comprised countries with high values of the synthetic measure, yet clearly lower than in the first group (range 0.552–0.609). According to the SMI ranking obtained, this group included Belgium, France, and Germany. In terms of the maturity of housing loan markets, these are markets characterised by a large scale and importance of mortgage credit in the economy, a relatively favourable pricing profile, and more stable financing conditions compared with countries with lower SMI scores. A feature of this group is also the important role of covered bonds as a refinancing instrument, which points to a strong linkage between mortgage funding and the capital market and a better matching of funding maturities to the long horizon of housing loans, which should support financial stability. Another characteristic supporting the resilience of the financial system is the relatively high share of fixed-rate loans in new lending, which limits households' exposure to interest-rate fluctuations and strengthens the resilience of the mortgage portfolio.

The third group (0.476–0.514) comprised the following countries: Ireland, Austria, Finland, Spain, Italy, Slovakia, and Portugal. Within this group, two subgroups are visible, which achieved a similar SMI level with a different structure of diagnostic variables. The first included Austria, Ireland, Italy, and Spain. In terms of maturity, these are markets with a greater role of fixed-rate loans in newly granted loans (CD9), which limits households' exposure to interest-rate risk. The second subgroup included Finland, Portugal, and Slovakia. This subgroup was characterised by relatively greater market depth and a greater role of covered bonds.

The fourth group consists of countries with the lowest values of the synthetic measure, falling within the range of 0.339–0.436. According to the ranking obtained, this group included the following countries: Czechia, Cyprus, Greece, Romania, Poland, and Hungary. This group of countries stands out from the other groups under study due to low indicators defining the size of the housing loan market. In addition, these are compounded by less favourable parameters of

pricing conditions or socioeconomic factors, which may limit the capacity of these markets for durable and sustainable development and increase their sensitivity to macroeconomic shocks.

The SMI ranking indicates the relative advantage of 'old' EU countries in the synthetic assessment of the maturity of housing loan markets, while Central and Eastern European countries were mostly located in the lower part of the distribution of SMI values. At the same time, it should be noted that some Southern European countries also recorded low SMI values, suggesting that the picture of housing loan market maturity in Europe is more complex.

Poland's position in the SMI ranking is relatively low. This means that, within the adopted set of diagnostic variables, Poland is characterised by lower relative closeness to the positive ideal solution and, simultaneously, a shorter distance from the negative ideal solution, both determined on the basis of the highest and lowest values of individual diagnostic variables in the group of countries under study. This result stems primarily from lower values of indicators describing the depth and saturation of the housing loan market (loan-to-GDP and loan-to-disposable-income ratios, as well as loans per capita), and also from relatively weaker parameters in the area of the structure and quality of funding, including the low role of mortgage covered bonds as an instrument for refinancing housing loans, which limits the linkage between mortgage funding and the capital market. In comparative terms, this indicates that the housing loan market in Poland plays a relatively smaller role in the economy than in the countries with the highest maturity, while the process of convergence towards the most developed housing finance models remains limited.

The study conducted is associated with certain methodological limitations that should be taken into account when interpreting the results. The SMI is a quantitative measure of the relative closeness of an alternative to the positive ideal solution and, simultaneously, its distance from the negative ideal solution, determined within the space of 19 EU countries. It is therefore legitimate to conclude that a given country is closer to the desired solution than another country, although it should be emphasised that the reference solution is relative rather than normative. In other words, it depends on the level of indicators in the population under study. Consequently, SMI values and ranking positions are sensitive to the composition of the countries under study, the selection and number of diagnostic variables, and the method of their normalisation. This implies an important limitation of the SMI. The SMI therefore serves only as an ordering tool and is used for comparative assessment within the adopted methodological framework. It is not, however, a measure of 'absolute' maturity. The literature also notes that '(...) there is a high probability of misinterpreting the obtained results due to the diversification of the positions of units between which there are no visible differences in the quality defined by diagnostic variables' (Jarocka, 2015). An additional limitation is that indicators reflecting market scale (e.g., the ratio of mortgage loans to GDP) do not always indicate a high level of market maturity, as they may also result from episodes of excessive credit expansion and the accumulation of financial leverage, which justifies a cautious interpretation of the results.

The study was static in nature. The synthetic maturity indicator reflects only the relative position of the markets under study at a given point in time, not the dynamics of their development. The results are also conditioned by the adopted subject scope (the set of diagnostic variables used) and object scope. The assessment covered only those EU countries for which it was possible to collect a complete set of information. Including additional variables could change the values of the maturity indicator and affect the ranking presented in the article.

The limitations identified indicate directions for further research, including in particular a sensitivity analysis of the results with respect to the selection of variables and the weighting system, as well as extending the study to include a dynamic perspective. Research on the evolution of the maturity of housing loan markets in individual countries could constitute a development of the approach presented in the article.

CONCLUSION

The findings of the study support the hypothesis that the degree of maturity of residential mortgage markets across the European Union countries varies considerably. The application of the authors' original framework, based on seven evaluation criteria and nine diagnostic indicators, together with the use of the TOPSIS method, made it possible to conduct a synthetic assessment of the analysed markets and to rank them according to their relative proximity to the ideal model of a mature market and their distance from the anti-ideal solution. At the same time, the study confirms the usefulness of multicriteria methods in analysing complex processes taking place in financial markets.

The analysis reveals a clear segmentation of European residential mortgage markets in terms of the criteria and indicators adopted in the study. The highest-ranked positions are occupied by the countries of Northern and Western Europe, which are characterised by substantial market depth, well-developed refinancing mechanisms based on covered bonds, relatively stable pricing conditions, and a significant share of fixed-rate mortgage lending. This pattern of results indicates that the maturity of residential mortgage markets depends not only on the level of outstanding mortgage debt but also on the sustainability of funding sources, the degree of capital market development, and the capacity of the financial system to manage long-term risk.

The countries of Central and Eastern Europe are concentrated in the lower part of the ranking. This is attributable primarily to the smaller scale of their residential mortgage markets, the weaker integration of mortgage finance with capital markets, and less developed mechanisms for mitigating interest rate risk. These findings demonstrate that the convergence of housing finance models within the European Union remains incomplete and that institutional and historical differences continue to exert a significant influence on the level of development of individual mortgage markets.

The results further highlight the importance of the interest rate structure of residential mortgage loans as one of the key dimensions of market maturity. Both the literature review and the comparative analysis indicate that a higher share of fixed-rate mortgages is characteristic of more developed financial systems possessing the institutional and market infrastructure necessary for the effective management of interest rate risk. This suggests that the development of residential mortgage markets should be assessed not only in terms of their size but also with regard to the quality of mortgage products offered, the stability of funding sources, and the degree of protection afforded to borrowers against macroeconomic shocks.

At the same time, several limitations of the study should be acknowledged. The proposed synthetic maturity index is relative in nature and depends on the selected group of countries, the choice of diagnostic indicators, and the normalisation procedure employed. Consequently, the resulting ranking should not be interpreted as an absolute classification of the level of development of residential mortgage markets. Furthermore, some of the indicators used, particularly those reflecting market size, may capture not only the degree of market maturity but also the consequences of previous phases of rapid credit expansion or high levels of household indebtedness. Therefore, the results should primarily be regarded as a comparative analytical tool rather than as an absolute measure of market development.

Future research should examine the robustness of the ranking through the application of alternative sets of diagnostic indicators. Another promising direction for further research would be to identify and analyse the development trajectories of individual residential mortgage markets.

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Effective supervision of an entity carrying out activities entrusted by a financial institution

ABSTRACT

This article analyses a controversial position in case law according to which an investment fund company, when outsourcing activities to a third party (i.e. under an outsourcing agreement), is obliged to ensure effective ongoing supervision of that entity. This position was expressed by the Provincial (Voivodship) Administrative Court in Warsaw in its judgment of 18 April 2024 (case number: VI SA/Wa 8336/22). In the author's view, this interpretation goes beyond the literal wording of the provision, which may pose a serious risk to financial institutions that use outsourcing agreements. The risk is all the greater given that the aforementioned position of the Provincial (Voivodship) Administrative Court in Warsaw stems from the Polish Financial Supervision Authority's (KNF) adoption of a law-making interpretation of Article 45a(4a) of the Act on Investment Funds and the Management of Alternative Investment Funds, according to which the ongoing supervision of the company must be effective.

These considerations constitute a doctrinal response to the position of the KNF and the Provincial (Voivodship) Administrative Court in Warsaw regarding the obligation of a financial institution acting as an outsourcer to ensure effective supervision, and demonstrate that the position adopted is *contrary to the law* and gives rise to very serious risks. It has also been demonstrated that the position adopted by the Polish Financial Supervision Authority (KNF) and the Provincial (Voivodship) Administrative Court in Warsaw is one that stands in clear opposition to the principles of administrative liability.

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INTRODUCTION

Pursuant to Article 45a(4a) of the Act of 27 May 2004 on investment funds and the management of alternative investment funds,¹ an investment fund management company is obliged to exercise ongoing supervision over the performance of the entrusted activities (i.e. the activities referred to in Article 45a(1)–(2) of the on Investment Funds) (Mroczkowski, 2011, p. 301 et seq.), regardless of the entity carrying them out. The provision of Article 45a of the Investment Funds Act provides the legal basis for a company to enter into agreements under which the performance of specific activities related to the company's operations may be entrusted to an external entity (an outsourcing agreement). However, such entrustment may not cover the entire scope of the company's activities, as is explicitly stated in Article 45a(2) of the Act on Investment Funds. Legal scholars have noted that the scope of the entrusted activities must be defined in such a way that the company continues to actually carry out the activities specified in Article 45 of the Act on Investment Funds (Dumkiewicz, 2018), whilst also taking into account the provisions of Articles 75–82 of Regulation 231/2013.

The interpretation of this provision – it would seem – should not give rise to any doubts; in the wording of the provision in question, the legislator has imposed on an investment fund company which entrusts the performance of activities to a third party the obligation to exercise ongoing supervision over the performance of those activities by that third party. The company is therefore obliged to exercise ongoing supervision, and thus to supervise, on an ongoing basis (continuously, throughout the entire term of the outsourcing agreement), the performance of these activities by the third party. In essence, the aim here is for the company – within the framework of the outsourcing agreement referred to in Article 45a(4) of the Act on Investment Funds – to establish and implement a contractual mechanism for ongoing supervision of the third party's performance of the activities entrusted to it. In the context of the delegation standards set out in Article 75 of Regulation 231/2013, the contractual mechanism for ongoing supervision should include at least: (i) methods and procedures for the ongoing review of services and responses in the event of a risk that the contractor will not perform its functions effectively or in accordance with the law, (ii) the investment fund management company's (TFI's) powers regarding information, inspection, entry, access and the issuing of binding instructions, (iii) a requirement for the contractor to conduct its own internal supervision and manage risks, and (iv) a business continuity plan on the part of the contractor; these elements

¹ Consolidated text: Journal of Laws of 2024, item 1034, as amended; hereinafter: the Act on Financial Instruments.

are implemented in Article 45a(4)(3), (5) and (7) of the Act on Investment Funds (Rodzyńkiewicz & Sarkowicz, 2023). This supervision is intended to be ongoing supervision, i.e. it is not to be preliminary or ex post supervision (Administrative law doctrine distinguishes between: preventive (preliminary) supervision – carried out before the supervised entity commences operations in order to prevent potential irregularities, verification (ongoing) supervision – involving the verification of actions taken by the supervised entity; and ex post supervision – amounting to the imposition of consequences on the supervised entity in the event of irregular conduct; Starościak, 1964, p. 93; Chęłmoński, 2005, pp. 539–540), though this is to be ongoing supervision, where the subject of such supervision is the performance by a third party of the tasks entrusted to it.

The essence of the aforementioned obligation is therefore, firstly, that the company must ensure that supervision is exercised (i.e. this is to be supervision within the scope of the company's powers arising from the contract under Article 45a(4) of the Act on Investment Funds, i.e. supervision based on private law provisions); secondly, that, in terms of the subject matter, the supervision relates to the entity to which the company entrusts the performance of activities, in accordance with Article 45a(1)–(2) of the Act on Investment Funds; (i.e. that the supervision should in no circumstances relate to entities other than the entity referred to in Article 45a(1) of the Act on Investment Funds); thirdly, that, in terms of subject matter, the supervision should relate only to the performance by that entity of the activities referred to in Article 45a(1)–(2) of the Act on Investment Funds (i.e. that supervision should under no circumstances relate to any other activities carried out by that entity); fourthly and finally, that, from a functional perspective, the supervision should be ongoing supervision (i.e. that the private-law supervision arising from the provisions of the contract should not, under any circumstances, constitute preliminary or ex post supervision, but should be ongoing supervision). It is worth noting, however, that from a functional perspective, the legislator did not in any way indicate that the ongoing supervision referred to in Article 45a(4a) of the Act on Financial Instruments was effective supervision.

It is worth noting, by applying the principles of linguistic interpretation, that the absence of such an indication is the result – it would seem – of the legislator's rationality; the legislator is, of course, – is fully aware that different expectations must be formulated in relation to administrative supervision, which is based on the exercise of administrative authority, and different expectations in relation to private-law supervision, which is in no way based on the exercise of administrative authority. It is worth recalling here that administrative authority is the power to resolve individual situations unilaterally in a manner that is permanent and binding on all legal entities within the state, and secured by state coercion, where the content of the decision involves the imposition of an obligation (Boć, 1994, p. 23; Nowicki & Peszkowski, 2015, p. 12). It is also worth noting that administrative authority is, of course, specific to administrative law relationships; whereas in the case of the ongoing supervision referred to in Section 45a(4a) of the Act on Financial Instruments, we are dealing with supervision under

private law, i.e. supervision arising not from a relationship of administrative subordination of the supervised entity to the public administration body exercising supervision, but from the provisions of the agreement referred to in section 45a(4) of the Act on Financial Instruments, and supervision based on a relationship of equality between the supervising entity and the supervised entity. This latter relationship does not contain any elements of administrative law and is not based on administrative authority.

In light of the above, the position of the Provincial (Voivodship) Administrative Court in Warsaw, as set out in its judgment of 18 April 2024, (VI SA/Wa 8336/22), in which the Provincial (Voivodship) Administrative Court in Warsaw *explicitly* stated, in particular, that: *nevertheless, this supervision was not carried out on an ongoing and effective basis*; as well as that: *where, however – due to the Manager’s conduct – it was not possible in practice to exercise effective supervision, the Company should have terminated its cooperation with the Manager. The Company should therefore have ensured that the Manager performed the functions entrusted to him effectively and in accordance with applicable law and regulatory requirements*; and finally, that: *one must agree with the authority’s position that there was a failure to exercise effective, ongoing supervision over the Manager, of a continuous nature, extending over successive quarters in relation to the Funds under management*. The Provincial (Voivodship) Administrative Court in Warsaw therefore essentially pointed out that Article 45a(4a) of the Act on Investment Funds imposes – on the fund management company – an obligation to exercise effective day-to-day supervision over the activities of the third party referred to in Article 45a(4a) of the Act on Investment Funds. The position regarding ‘effective’ (as a synonym for ‘effective’) supervision has also been expressed in the literature (Rodzynekiewicz & Sarkowicz, 2023); however, the author of this article, in view of the circumstances discussed in detail in this publication, presents a position that differs from that set out therein.

Bearing in mind that the aforementioned position of the Provincial (Voivodship) Administrative Court in Warsaw regarding the obligation of an investment fund company to ensure effective ongoing supervision is a position which, in the author’s view, lacks sufficient support in the linguistic interpretation and principles of application of the sanctioning provisions (which will be the subject of further discussion later in this article) and a position which, it would appear, poses a particular threat to trading practice; it therefore seems appropriate to ‘examine’ the interpretation of the provision in Article 45a(4a) of the Investment Funds Act and the correct understanding of the concept of ‘ongoing supervision’ within the meaning of Article 45a(4a) of the Investment Funds Act in connection with Article 45a(4)(7) of the Act on Financial Instruments.

Methodologically, the article presents both arguments in favour of an interpretation limiting the concept of ‘ongoing supervision’ to civil-law supervision, and arguments in favour of an understanding encompassing the element of ‘effectiveness’, arising, amongst other things, from the phrase ‘effective supervision’ and supervisory practice. The aim is to ‘weigh up’ these arguments as objectively as possible and to present the interpretative assumptions transparently.

1. ONGOING SUPERVISION OF THE ACTIVITIES OF A THIRD PARTY TO WHICH – UNDER THE TERMS OF AN OUTSOURCING AGREEMENT – THE PERFORMANCE OF CERTAIN TASKS IS ENTRUSTED

From Article 45a(4a) of the Act on Financial Instruments in conjunction with Article 45a(4)(7) of the Investment Funds Act, it follows that the day-to-day supervision referred to in Article 45a(4a) of the Investment Funds Act is undoubtedly a mechanism of civil law and is not, to any extent, a mechanism of administrative law. It is, after all, obvious that an investment fund company is not an entity forming part of the administrative apparatus and is not vested with any instrument of administrative authority. It is equally obvious that the source of this supervision lies in the provisions of the agreement referred to in Article 45a(4) of the Act on Investment Funds, and not in the provisions of substantive administrative law, which would endow an investment fund company with any supervisory powers. From a subjective perspective (the legal status of the investment fund company) and from an objective perspective (supervision derived from the provisions of the agreement referred to in section 45a(4) of the Investment Funds), we are not, in fact, dealing with administrative supervision, but rather with supervision under private law (civil law).

The fact that the supervision referred to in Article 45a(4a) of the Act on Investment Funds is a form of civil-law supervision means that such supervision exists solely to the extent provided for in the terms of the management agreement under Article 45a(4) of the Act on Investment Funds – and this must be emphasised – one of *the essential elements* of that agreement. For, in accordance with Article 45a(4)(7) of the Act on Investment Funds, one of the constituent elements specific to a trust agreement is to enable – *verba legis* – *the company to effectively supervise the performance of the activities entrusted to it*, and thereby to ensure that the company will be able to effectively exercise ongoing supervision over the performance by a third party of the activities entrusted to that party. It is, after all, evident that the provisions of Article 45a(4)(7) of the Act on Investment Funds must be interpreted in conjunction with the provisions of Article 45a(4a) of the Act on Investment Funds, as the supervision referred to in Article 45a(4)(7) of the Act on Investment Funds is, in fact, the ongoing supervision referred to in Article 45a(4a) of the Act on Investment Funds. The basis for exercising ongoing supervision under Article 45a(4a) of the Act on Investment Funds is the provisions of the agreement referred to in Article 45a(4)(7) of the Act on Investment Funds, and the fund's effective supervision of the performance by a third party of the activities entrusted to it is manifested in the fund's exercise of ongoing supervision under Article 45a(4a) of the Act on Investment Funds. The supervision referred to in Article 45a(4)(7) of the Act on Investment Funds is the ongoing supervision referred to in Article 45a(4a) of the Act on Investment Funds, where this interpretation is supported both by the prohibition on antonymic interpretation – which is one of the principles of interpretation – and by the result of a systematic interpretation of both provisions, which must obviously be interpreted together. For the sake of clarity, it is worth noting that 'ongoing' (paragraph 4a) defines the timeframe and manner of carrying out

contractual supervision, whilst ‘enabling effective supervision’ (paragraph 4(7)) sets out the minimum functional standard for contractual mechanisms – rather than a result in the form of ‘effectiveness’ understood as a guarantee of the absence of breaches on the part of the contractor (Dumkiewicz, 2018; Ferran, Howell & Steffek, 2023, Moloney, 2014; Rodzynkiewicz & Sarkowicz, 2023).

This, in turn, leads to the conclusion that the provisions of the entrustment agreement referred to in Article 45a(4)(7) of the Investment Funds Act, must be worded in such a way as to ensure that the investment fund company is entitled to exercise day-to-day supervision over the performance by a third party of the activities entrusted to it in connection with the business conducted by that company. It should be emphasised once again that this supervision is a matter of private law, not administrative law, where the relationship between the investment fund company and the entity carrying out the activities entrusted to it is a civil law relationship, which presupposes the equality of the parties, rather than an administrative law relationship, which presupposes the subordination of the administered entity to the administering entity.

The private-law nature of this supervision, combined with the purely civil-law relationship between the investment fund company and the entity entrusted with carrying out the activities, determines that the term ‘ongoing supervision’ should be understood as the investment fund company’s continuous exercise – using the mechanisms set out in the contract – of control over that entity’s activities and – where such control leads to the finding that there are any irregularities within the scope of that entity’s activities relating to the performance by that third party of the tasks entrusted to it – the ability to exert contractual influence over that entity so that such irregularities are rectified as efficiently as possible, along with their adverse consequences (provided, of course, that achieving such a result is generally possible through the use of civil law mechanisms). It must be categorically emphasised that neither the day-to-day control exercised by the investment fund management company nor the investment fund management company’s ability to influence the third party contractually are based on the concept of administrative authority; consequently, the private-law supervision exercised by the investment fund management company over that third party will in no circumstances be, as it were, a replica of administrative supervision (Moloney, 2014), which is exercised by the Polish Financial Supervision Authority (KNF) and is based on the concept of administrative authority. An investment fund management company may not therefore – whilst exercising day-to-day supervision – use any administrative-legal instruments of influence; rather, it may use only those instruments of influence which are of a contractual nature and which necessarily arise from the provisions of the agreement referred to in Article 45a(4) of the IFA. It is essential to emphasise categorically that these instruments do not have an authoritative character, which stems, for example, from the fact that a civil-law relationship is based on the equality of the parties, rather than on the subordination of one party to the other (a relationship of subordination which is characteristic of an administrative-legal relationship). A consequence of this nature of the relationship and the fact that we are dealing here with a civil law contract

is that the parties to the entrustment contract – in shaping the terms of the contract – enjoy a degree of freedom which derives from Article 353¹ of the Act of 23 April 1964 – the Civil Code.

As a side note to the above considerations, it is worth pointing out that the legal literature correctly observes that *the principle of freedom of contract therefore means that the parties to a contract may shape its content at their discretion, establishing a contractual relationship that corresponds to their interests. The limits on freedom of contract set out in Article 353¹ of the Civil Code relate to the content of the contract and to the purpose of the legal relationship established by the parties (II CSK 290/13; Fuchs 2018, III AUa 940/15)*. In practice, this means that the parties to the contract are bound both by the provisions of Article 45a(4) of the Act on Investment Funds and by good practice and the nature of the relationship, the nature of which precludes the possibility of basing a fund's supervision of a third party on administrative authority. The consequence of this latter statement is that the position of the Polish Financial Supervision Authority (KNF) of 15 May 2018 (the KNF Position) does not appear to be correct; in that position, the KNF stated in particular that: *In view of the above, in the UKNF's assessment, the company should ensure that it is able to influence the actions of the entity with which it has concluded a contract, to the extent that that entity is performing the contract with the company, including ensuring that it has the power to issue binding instructions and orders to the manager concerning the management of the closed-end investment fund's investment portfolio. At the same time, the fund management company should provide for appropriate mechanisms in such a contract to enable it to effectively enforce such instructions and orders.*

Hypothetically, if the fund management company were granted *the power to issue binding instructions and orders to the manager regarding the management of the closed-end investment fund's investment portfolio, whilst the fund management company were to provide for appropriate mechanisms in such an agreement enabling it to effectively enforce such instructions and orders*, this would constitute an instrument of administrative law, rather than private law; consequently, such a provision would run counter to the nature of the relationship between the management company and a third party, and would thus constitute an element exceeding the scope of the parties' contractual freedom arising from the principle set out in Article 353¹ of the Civil Code. The latter, in turn, would imply that such provisions, or indeed the entire contract, would be void, i.e. the consequence referred to in Article 58 § 1 of the Civil Code.

Similarly, the position of the Polish Financial Supervision Authority (KNF) is incorrect, according to which: *'Furthermore, the supervision exercised by the company should, amongst other things, ensure that the manager manages the investment portfolio of a closed-end investment fund in accordance with the Act and the articles of association of the fund in question, whilst taking into account the interests of the fund's unit-holders' (Position of the UKNF)*. The obligation to ensure proper operation is, in fact, the responsibility of the KNF, not that of the investment fund management company (*argument based on Article 2 of the Act of 21 July 2006 on the supervision of the financial market*), and its fulfilment is based on the KNF being vested with powers grounded in the mechanism of administrative authority; where, in the purely

hypothetical event of an attempt to confer administrative authority upon an investment fund management company pursuant to the provisions of a contract under Article 45a(4) of the Act on Investment Funds, we would be faced with a similar overstepping of the scope of contractual freedom under Article 353¹ of the Civil Code. The latter would similarly entail the consequence referred to in Article 58 § 1 of the Civil Code.

In this context, it should be noted that the principle of freedom of contract allows the parties to shape their mutual legal relationships as they see fit and to establish contractual obligations; however, this freedom is restricted where the provisions of the contract lead to a breach of the law, the circumvention of applicable regulations, an abuse of rights or a breach of the principles of social justice (III AUa 15/21; III AUa 580/19). Legal literature emphasises that the principle of freedom of contract, set out in Article 353¹ of the Civil Code, enables the parties to create non-standard contractual relationships. They may use standardised contract templates, but they also have the right to make modifications or additions to these contracts, thereby creating a legal instrument that better suits their needs. The principle of freedom of contract therefore means that the parties may formulate the content of the contract in accordance with their preferences, creating a contractual relationship that best serves their interests. The scope of freedom of contract, in accordance with Article 353¹ of the Civil Code, relates both to the content of the contract and to the legal purpose which the parties intend to achieve (Fuchs, 2018; CSK 290/13).

A closer examination of the KNF's position cited above leads to the conclusion that the only part of that position with which one can agree – and which is correct – is the part stating that: *Supervision should be exercised by the Association on an ongoing basis, that is, continuously and throughout the entire term of the contract referred to in Article 45a(1) of the Act (UKNF Position)*. In fact, this supervision is intended to be ongoing, i.e. it is to be carried out on an ongoing basis and throughout the entire term of the provisions of the agreement under Article 45a(4) of the Act on Financial Instruments.

Referring to the aforementioned position of the Polish Financial Supervision Authority (KNF), it is also worth noting its surprising structure. Thus, in the first instance, the KNF – correctly – pointed out that: *In the context of the aforementioned provisions of the Act, as well as the provisions of Articles 75–82 of Regulation 231/2013, it should be noted that an investment fund company should ensure that the legal relationship established by contract between the company and the entity which has been entrusted with the performance of the assigned activities, enables the company to exercise ongoing supervision (...)*, whilst only in the next step did the KNF – in a sense elaborating on the concept of 'ongoing supervision' – state that: *In view of the above, in the opinion of the UKNF, the company should ensure that it has the ability to influence the actions of the entity*.

To complete the picture, it should be noted here that the delegation of functions by AIF managers is regulated in Articles 75–82 of Regulation 231/2013 (Dumkiewicz, 2018), which emphasise

the requirements for due diligence in the selection and supervision of the entity performing the functions, the proportionality of supervisory measures, and the assurance of an uninterrupted capacity to perform key functions. Consequently, the fulfilment of supervisory duties by an AIFM under the function delegation model requires the retention of responsibility and decision-making authority in key areas, in particular through the maintenance of risk management relating to the delegation of functions. The instrument enabling the exercise of supervision in this sense remains a properly structured delegation agreement, ensuring extensive powers of information, inspection and guidance, including mechanisms for further sub-delegation, conditions for terminating the cooperation, requirements regarding business continuity and the protection of confidentiality of information. At the same time, in accordance with the principle of due diligence, supervision of the entity performing the functions should be continuous and proportionate, as reflected in regular reporting, the conduct of inspections and audits, periodic reviews of indicators, compliance tests and the taking of immediate corrective action in the event of irregularities being identified (EBA Guidelines, 2019). Of particular importance in this regard is ensuring the proper management of conflicts of interest, including the functional and hierarchical separation of duties and a full cycle of identifying, monitoring and disclosing conflicts to AIFMs and investors. An integral part of this supervisory regime is also ensuring that supervisory authorities and auditors have the necessary access to data, documents and premises at all levels of the delegation chain. These requirements are complemented by the maintenance of tested contingency plans and the capacity to seamlessly transfer functions or bring them back in-house, without compromising the quality and continuity of management. A supervisory model structured in this way enables the AIFM to comply with the general principles arising from the relevant regulations, maintain effective control over delegated functions, ensure compliance with applicable requirements, whilst at the same time mitigating the regulatory risks associated with the loss of its status as an AIF manager. It should be noted, however, that supervision within the meaning of Articles 75–82 of Regulation 231/2013 has not, however, been explicitly defined as supervision that is to be effective – in the sense used by the Provincial (Voivodship) Administrative Court in Warsaw in its judgment of 18 April 2024, reference number: VI SA/Wa 8336/22.

As a result, we are faced with a rather surprising situation where the Polish Financial Supervision Authority (KNF) first categorically points to a statutory obligation and then – whilst interpreting the content of that obligation – the KNF, in formulating its position, qualifies that this position is merely the assessment of the Polish Financial Supervision Authority (KNF). Such action by the Polish Financial Supervision Authority (KNF) is surprising in that it runs counter to the principle of public trust in state authorities. The principle referred to above is enshrined, amongst other places, in Article 8 of the Code of Administrative Procedure, under which public administration bodies are obliged to conduct proceedings in a manner that inspires confidence in public authority amongst those involved. This principle plays a key role from the perspective of so-called social justice in procedural terms, as it imposes on the authority conducting the proceedings an obligation to justify its actions and explain their basis. It is important to note

that the principle of trust in public authorities is also enshrined in constitutional provisions. In accordance with the principle of a democratic state governed by the rule of law, as laid down in Article 2 of the Constitution of the Republic of Poland, there arises a rule of citizens' trust in the state and in the law established by that state, which imposes specific obligations on the state in various areas of its activity. The protection of this trust manifests itself in two key spheres of the administration's functioning: firstly, in the stability of relations arising from the administration's official actions, in particular from final administrative decisions; and secondly, in the compensation of financial losses suffered by citizens as a result of the revocation or amendment of such decisions. From the principle of the protection of legitimate expectations, one can therefore derive a standard of certainty in the application of the law, which means that state authorities should act in a manner ensuring that their decisions – including those concerning individual matters within the sphere of public administration – constitute a logical and consistent outcome of the process of governance in a well-organised state. Consequently, only conduct on the part of administrative authorities that meets the requirement of predictability, based on clear and rational grounds, can be regarded as trustworthy (VI SA/Wa 42/20; II UKN 685/98; IV SA/Wa 1300/17).

It can reasonably be assumed that the position taken by the Polish Financial Supervision Authority (KNF) is, in a sense, the root cause of the position – which poses a threat to trading practice – regarding the obligation to ensure effective day-to-day supervision. An analysis – in the context of the aforementioned judgment of the Provincial (Voivodship) Administrative Court in Warsaw – leads to the conclusion that the KNF assumes – which is entirely incorrect – that a hypothetical breach of the law by an entity to which the company has entrusted the performance of activities would lead the KNF to conclude that ongoing supervision was not effective (since ongoing supervision failed to ensure that *the manager would manage the investment portfolio of the closed-end investment fund in accordance with the Act and the fund's articles of association, whilst taking into account the interests of the fund's unit-holders*), and thus implies the KNF's finding that the investment fund company committed an irregularity (i.e. an administrative offence amounting to a breach of the obligation under Article 45a(4a) of the Act on Investment Funds). In turn, the commission of an administrative offence by the investment fund management company gives rise – in the KNF's incorrect assessment – to the administrative liability of the investment fund management company, as referred to in the provisions deriving from Article 228(1) of the Act on Investment Funds. The consequence of such an – incorrect, it must be emphasised – understanding and interpretation by the KNF of the provision in Article 45a(4a) of the Act on Investment Funds is that the KNF applied administrative liability measures against the investment fund company (i.e. an administrative fine and a follow-up supervisory measure in the form of the revocation of its operating licence), an administrative decision which was subsequently reviewed by the Provincial (Voivodship) Administrative Court in Warsaw. Consequently, the outsourcing regime shapes a multi-tiered architecture of liability and supervision: (i) civil liability and ongoing contractual supervision by the investment fund management company (TFI) over the contractor, (ii) public-law supervision

by the Polish Financial Supervision Authority (KNF) over the investment fund management company (TFI) and – within statutory limits – over the entities to which activities have been entrusted, and (iii) in specific areas (e.g. securitisation) – an additional licensing and sanctions regime applicable to the contractor. This stratification is of interpretative significance when assessing the scope and content of the obligations assigned to the investment fund management company (TFI). It is worth noting at this point – a matter which will be discussed in greater detail in the next paragraph of this article – that the Provincial (Voivodship) Administrative Court in Warsaw, similarly incorrectly, accepted – following the KNF's view – that the supervision referred to in Article 45a(4a) of the Act on Investment Funds must be effective supervision. The above provides a starting point for analysing whether, under the provisions of Article 45a(4a) of the Act on Investment Funds, it is generally possible to take the view that the ongoing supervision referred to in that provision is intended to be effective supervision.

2. EFFECTIVE ONGOING SUPERVISION?

The aforementioned positions of the Polish Financial Supervision Authority (KNF) and the Provincial (Voivodship) Administrative Court in Warsaw provide – as indicated – a basis for analysing whether, in the case of the ongoing supervision referred to in Article 45a(4a) of the Act on Investment Funds, it can generally be argued that such supervision must be effective, and consequently whether it can generally be argued that a breach by an entity to which the company has entrusted the performance of activities – be it of the provisions of the Act on Investment Funds, or the provisions of the fund's articles of association, or acting without regard to the interests of the fund's unit-holders, constitutes a breach by the investment fund management company of the obligation under Article 45a(4a) of the Investment Funds Act, and thus that this constitutes an administrative offence on the part of that investment fund management company.

At this point, it must be categorically stated that the analysis carried out shows that it cannot under any circumstances be inferred that the provision of Article 45a(4a) in conjunction with Article 45a(4)(7) of the Act on Investment Funds imposes an obligation on the investment fund management company to ensure effective ongoing supervision; for the provision cited imposes solely an obligation on the investment fund company to ensure ongoing supervision. A number of arguments support the above position.

Firstly, drawing on the tools of linguistic interpretation, it should be noted that if the legislator's sole intention had been for the ongoing supervision referred to in Article 45a(4a) of the Act on Investment Funds to be effective supervision, this intention would have been expressed by the legislator in Article 45a(4a) of the Act by adding the qualifier: 'effective'. It is worth emphasising that the interpretation of the provisions – which form the legal basis for the Polish Financial Supervision Authority (KNF) to take regulatory action (where, in the hypothetical event that the KNF's position were to be upheld, namely that the ongoing supervision under Article 45a(4a)

of the Act on Investment Funds must be effective supervision, and thus a breach of the law by a third party simultaneously constitutes an administrative offence on the part of the investment fund company, which in turn gives rise to the company's administrative liability under Article 228(1) of the Act on Investment Funds) must be carried out in accordance with their literal wording. It is therefore not permissible, when interpreting legal provisions, to apply other types of interpretation – such as purposive or systemic interpretation – in order to arrive at a meaning of a given provision that differs from that resulting from a linguistic interpretation (I OSK 653/13) (P 2/03; II GSK 972/08; Gajek, 2019, p. 16). Administrative court case-law correctly holds that, in this category of cases, the results of a linguistic interpretation may be set aside only in exceptional circumstances, e.g. where they are grossly inconsistent with the presumption of a rational legislator (III SZP 4/15; III SK 51/15; III SK 75/15). Similarly, the application of an expansive interpretation (I OSK 1750/17), analogy (II SA/Łd 203/21) or presumptions (III SK 59/13; XVII AmE 92/17; II GSK 1019/19; Krawczyk, 2019, Lex/el).

The fact that the legislator did not introduce the term 'effective' in Article 45a(4a) of the Investment Funds Act should, consequently, be understood to mean that an investment fund company is required to ensure ongoing supervision, rather than effective ongoing supervision. The latter obligation has not, in fact, been incorporated into the legal framework. Consequently, the activities of an investment fund company may be subject to sanctions only if that investment fund company fails to ensure ongoing supervision, and not if, whilst it does ensure ongoing supervision, but it subsequently proves to be ineffective (i.e. it fails, as it were, to prevent a breach of the law by the entity to which the investment fund company has entrusted the performance of activities) (Rodzynekiewicz & Sarkowicz, 2023). It is, after all, obvious that if the legislator's sole intention had been for the obligation under Article 45a(4a) of the Investment Funds Act to relate to the exercise of effective ongoing supervision, this intention would have been confirmed by the legislator's use of the qualifier: **'effective'**.

Secondly, as a sort of elaboration on the first point above, it should be noted that – purely hypothetically – if the provision in Article 45a(4a) of the Act on Investment Funds implied an obligation on the part of an investment fund company to ensure effective day-to-day supervision, then the Polish Financial Supervision Authority (KNF) – in its position (the UKNF's Position) – would not, it seems, have used the phrase *'in the UKNF's view'*, but would have categorically stated the existence of such an obligation. It is, after all, obvious that if such an obligation (i.e. to ensure effective ongoing supervision, that is – in the opinion of the UKNF – supervision which, amongst other things, guarantees *that the manager will manage the investment portfolio of a closed-end investment fund in accordance with the Act and the fund's articles of association, whilst taking into account the interests of the fund's unit-holders*) were to arise from statutory provisions, the KNF would not have used the phrasing employed, *in the opinion of the UKNF*, but would have referred directly and explicitly to a statutory obligation (as, for example, was the case in other paragraphs of the aforementioned KNF position).

Thirdly, it should be recalled that the provision set out in Article 45a(4a) in conjunction with Article 45a(4)(7) of the Act on Investment Funds constitutes an exception to the principle of freedom of economic activity (VI SA/Wa 1957/12; Sobaczak, 2021, p. 7 ff.; Szydło, 2005, p. 14 ff.; Sowiński, 2007), as well as from the principle of freedom of contract under Article 353¹ of the Civil Code. The nature of this provision (in fact, of these provisions) determines the direction of their interpretation, which must take the form of a strict interpretation (Morawski, 1997, pp. 202–203; II UK 236/06). The consequence of this latter observation is that the provision in Article 45a(4a) of the Act on Financial Instruments must be interpreted strictly; consequently, the scope of the concept of ‘ongoing supervision’ must be interpreted as narrowly as possible and must not, under any circumstances, be interpreted broadly (as was also mentioned in point (i) above). The adoption by the Polish Financial Supervision Authority (KNF) and subsequently by the Provincial (Voivodship) Administrative Court in Warsaw of the position that ‘ongoing supervision’ under Article 45a(4a) of the Act on Investment Funds is to constitute effective ongoing supervision is, of course, an expression of a broad interpretation of the obligation set out therein, which stands in clear opposition to the aforementioned principle.

Fourthly, it should be recalled that the fulfilment by an investment fund company of the obligation under Article 45a(4a) of the Act on Investment Funds has been secured by means of the administrative liability mechanism under Article 228(1) of the Act on Investment Funds; which similarly dictates the manner in which the provision of Article 45a(4a) of the Act on Investment Funds must be interpreted; such interpretation must be carried out using the tools applied in the interpretation of criminal law provisions (SK 70/06; SK 18/09; II SA/Ol 293/20). Thus, the interpretation of administrative law provisions forming the legal basis for the imposition of an administrative sanction should be similar to the process of interpreting provisions falling within the branch of criminal law, in particular by giving priority to textual interpretation over any other types of interpretation (GSK 30/04; GSK 31/04). In terms of the general principles of administrative sanctions law, it is necessary to consider to what extent interpreting the element of ‘effectiveness’ of ongoing supervision – if it were to serve as a criterion for attributing administrative liability to the investment fund management company (TFI) – remains consistent with the principles of specificity (predictability) and proportionality. On the one hand, this argues in favour of a strict linguistic interpretation of Article 45a(4a) of the Act on Investment Funds; on the other hand, one must not lose sight of the protective purpose of the regulations on outsourcing and the EU standards on the delegation of functions, which emphasise the adequacy and actual capacity of supervisory mechanisms to mitigate risks. This conflict of values should be resolved whilst respecting the primacy of a strict interpretation in criminal matters and the prohibition on retroactive application.

Bearing in mind, however, that the interpretation of the obligation under Article 45a(4a) of the Act on Financial Instruments must be carried out using the tools of linguistic interpretation, it is clear that from the wording of Article 45a(4a) of the Act on Financial Instruments cannot be used to derive an obligation which is not literally, directly and explicitly set out in that provision.

It is therefore in no circumstances permissible to assume that Article 45a(4a) of the Act on Investment Funds gives rise to an obligation which is not expressed in that provision; for the sole source of such an obligation would be – and this must be emphasised – the position of the Polish Financial Supervision Authority (KNF), where the Polish Financial Supervision Authority (KNF) has explicitly indicated the evaluative nature of that position. It is clear, moreover, that the Polish Financial Supervision Authority's (KNF's) interpretative position does not constitute, and cannot under any circumstances constitute, a source of law.

Fifthly, it should be noted that the purely hypothetical adoption of the position that the ongoing supervision referred to in Article 45a(4a) of the Act on Financial Instruments must be effective supervision would stand in clear opposition to one of the principles of administrative liability, namely the principle of the specificity of an administrative offence. In this context, it is worth noting that the principle of the specificity of an administrative offence is intended to provide individuals with legal protection against arbitrariness and abuse on the part of public authorities (Supreme Court judgment 22/02) in the regulation of legal liability, and thus in cases where the legislation provides for the possibility of imposing an administrative sanction (P 46/07; K 7/99). This is because provisions establishing administrative offences are required to meet the criteria of accessibility and predictability, which concern both the precise definition of prohibited acts and the penalties attached to them. The requirement for precision implies that the person concerned, on the basis of the wording of the relevant provision and, where necessary, its judicial interpretation, should be able to clearly determine which acts or omissions may give rise to legal liability. Turning to the considerations *strictly* addressed in this publication, it must be noted that in such a situation, an investment fund company would be held liable for a breach of a duty which is not expressly set out in generally applicable law and whose sole source is a discretionary position adopted by the Polish Financial Supervision Authority (KNF). In turn, a breach of this obligation – which derives exclusively from the KNF's discretionary position – would entail the company's administrative liability under Article 228(1) of the Act on Investment Funds.

It is worth noting here – somewhat as an aside to the present discussion – that in the case in which the Provincial (Voivodship) Administrative Court in Warsaw delivered its judgment, a judgment which served as the inspiration for this article, we were dealing precisely with the aforementioned breach of the principle of specificity. The Provincial (Voivodship) Administrative Court in Warsaw *explicitly* pointed out that the investment fund company exercised supervision over the entity to which the performance of activities had been entrusted, but that this supervision was ineffective (VI SA/Wa 8336/22), whereas there is no legal basis in the legislation for holding that the ongoing supervision referred to in Article 45a(4a) of the Investment Funds Act is intended to be effective.

Sixthly, it should be noted that the purely hypothetical assumption that the ongoing supervision referred to in Article 45a(4a) of the Act on Financial Instruments must constitute effective supervision would be in clear conflict with another principle of administrative liability, namely the objective nature of such liability (VI SA/Wa 1410/11; VI SA/Wa 2442/13). It should be noted

that the imposition of administrative penalties cannot be based on the principle of purely objective liability, which is entirely detached from the specific circumstances of the case in question, including an assessment of the perpetrator's fault. When applying a general legal provision, the administrative authority should adapt it to the specific circumstances of the particular case. The imposition of specific administrative sanctions by the authority must also be duly justified, bearing in mind that they are merely a means of achieving the objectives for which they were intended (SK 6/12). In light of this concept – as should be recalled – a party to sanction proceedings will be entitled to be exempted from administrative liability (II GSK 1019/19) if it demonstrates that it did everything that could reasonably be expected of it to prevent the breach of the law from occurring (P 12/01; Niżnik-Dobosz, 2011, p. 135). An investment fund company, however, would be liable – in the hypothetical scenario where the positions of the Polish Financial Supervision Authority (KNF) and the Provincial (Voivodship) Administrative Court in Warsaw were to be shared – for conduct (a breach of the law by an entity entrusted with carrying out activities) over which the company had no influence and could not have had any influence, and would thus bear administrative liability despite having done everything that could reasonably be expected of it to prevent a breach of the law.

Seventhly, it is worth noting that the KNF's position was issued on 15 May 2018, whilst the KNF's administrative decisions challenged before the Provincial (Voivodship) Administrative Court in Warsaw – and which were the subject of assessment by that court in the judgment that inspired this article – relate to the activities of this investment fund company and its cooperation with the so-called securitisation fund servicer, a collaboration which took place primarily before 15 May 2018. Consequently, we were faced with the retroactive application of a sanctioning provision – which in itself undermined the principles of a democratic state governed by the rule of law due to a breach of the fundamental principle of intertemporal law, namely the principle of non-retroactivity (*lex retro non agit*). It is worth recalling here that this principle amounts to a prohibition on applying newly enacted regulations to events that took place before those provisions came into force, events to which the law had not previously attached the legal consequences provided for by the new regulations, and thus to the requirement that legal events be governed by the provisions of substantive law in force at the time the legal event in question occurred (VI SA/Wa 8176/22; VI SA/Wa 2129/21; VI SA/Wa 179/21). In this context, the Provincial (Voivodship) Administrative Court in Warsaw – in another judgment – rightly pointed out that: *in administrative case law, it is rightly and consistently held on this matter that the absence of an unambiguous position on the part of the legislature as to which provisions should apply to events occurring prior to the entry into force of new provisions, does not, however, imply the existence of a 'regulatory gap'; as this should be filled by way of interpretation by the authorities applying the law; nevertheless, the rule in this regard cannot be the automatic application of the provisions of the new Act to legal situations (events) occurring prior to the date of its entry into force. The question of whether to give precedence to the principle of the continued application of existing provisions or to the principle of the direct application of the new Act must be determined on a case-by-case basis, taking into account*

the specific circumstances of the case and the nature of the provisions subject to amendment; one must also take into account the consequences that the adoption of one principle or the other may entail (cf. the resolution of the seven-judge panel of the Supreme Administrative Court of 10 April 2006, ref. no. I OPS 1/06, ONSAiWSA 2006 No. 3, item 71) (VI SA/Wa 8176/22).

Eighthly, it should be noted that the purely hypothetical assumption that the ongoing supervision referred to in Article 45a(4a) of the Act on Financial Instruments must be effective supervision, would stand in clear opposition to another of the principles of administrative liability, namely the individual nature of administrative liability. In this purely hypothetical situation, the investment fund company would, in fact, bear administrative liability for the actions of a third party, over which the investment fund company had no influence and could not have had any influence, where – it bears repeating – the investment fund company is equipped solely with private-law supervisory instruments (without administrative authority) and is not equipped with administrative-law instruments (i.e. supervisory instruments based on administrative authority).

The foregoing leads to the conclusion that it cannot, under any circumstances, be inferred from the wording of Article 45a(4a) in conjunction with Article 45a(4)(7) of the Act on Investment Funds that the ongoing supervision referred to in that provision is intended to be effective supervision. Such a position is, in fact, at odds both with the principles governing the interpretation of legal provisions and with the principles underpinning the structure of administrative liability. At this point – somewhat as an aside to the present discussion – it should be noted that the sole ‘argument’ in favour of the position that the ongoing supervision under Article 45a(4a) of theon investment funds is to be effective is the purely ‘judgemental’ position of the Polish Financial Supervision Authority (KNF), in which the Polish Financial Supervision Authority (KNF) directly and explicitly stated that this is solely the assessment of the UKNF and at no point indicated that this position constitutes a reference to provisions of generally applicable law.

It should be emphasised that this position – i.e. both the KNF’s position of 15 May 2018 and the KNF’s administrative decisions, which were challenged before the Provincial (Voivodship) Administrative Court in Warsaw, as well as the position of the Provincial (Voivodship) Administrative Court in Warsaw expressed in its judgment of 18 April 2024 – is particularly detrimental to trading practice. The hypothetical adoption and establishment of this position in practice will imply that a financial institution entrusting – by way of an outsourcing agreement – the performance of activities to a third party will bear full administrative liability for the actions of that entity, which will take place under the so-called ‘vicarious liability’ model and in breach of the aforementioned principles of administrative liability.

SUMMARY

The position – originally expressed by the Polish Financial Supervision Authority (KNF) and subsequently adopted by the Provincial (Voivodship) Administrative Court in Warsaw – as set out in the judgment of the Provincial (Voivodship) Administrative Court in Warsaw of

18 April 2024, appears to be particularly threatening to the day-to-day operations of financial institutions and their practice of outsourcing activities to third parties. A purely hypothetical acceptance of this position – and thus the assumption that the supervision exercised by a financial institution, acting as the so-called ‘outsourcer’, over the activities of the so-called ‘insourcer’ must be effective – would give rise to numerous adverse legal consequences which, should they materialise – may even lead to a reluctance on the part of financial institutions to entrust the performance of activities to third parties; such entrustment would, after all, entail an excessive risk of administrative liability for that financial institution.

It is conceivable, after all, that the so-called ‘insourcer’ might commit a breach of the law, over which the financial institution – despite exercising ongoing supervision over its activities – had no influence and could not have had any influence, and which the financial institution – despite exercising day-to-day supervision and exercising professional diligence in this regard – could not, under any circumstances, have prevented. In such a situation, such a breach of the law – which, it must be emphasised, was committed by the so-called ‘insourcer’ and over which the so-called ‘outsourcer’ – despite exercising ongoing supervision over the insourcer’s activities and exercising professional diligence – had no influence whatsoever over, nor could it have had any influence over, and could not have prevented, will be treated by the Polish Financial Supervision Authority (KNF) as an administrative offence on the part of the financial institution (the outsourcer) and will entail administrative liability on the part of that financial institution. In such a case, we shall be dealing with the administrative liability of the financial institution, which administrative liability will stand in clear opposition – as indicated above – to the principles governing the interpretation of substantive law, which provisions form the legal basis for the KNF to apply ex post supervisory measures, as well as in clear opposition to the principles of administrative liability. Such action by the KNF would, in turn, constitute a clear violation of the foundations upon which the structure of a democratic state governed by the rule of law is built.

It should be emphasised here that the above risk is all the more serious given that the article was not based on a purely doctrinal interpretation of the provision in Article 45a(4a) of the Act on Financial Instruments and the position set out in the academic literature, but on a non-final judgment of the Provincial (Voivodship) Administrative Court in Warsaw dated 18 April 2024, in which the Court upheld the KNF’s actions as correct, where the KNF had applied precisely such a law-making interpretation of the provision in Article 45a(4a) of the Act on financial investment institutions and held that ongoing supervision must be effective. In conclusion, I would like to express the hope that the above will be recognised by the Supreme Administrative Court, which will exercise its cassation powers in the aforementioned case and eliminate this – the position of the Polish Financial Supervision Authority (KNF) and the Provincial (Voivodship) Administrative Court in Warsaw, which is extremely detrimental to the functioning of financial institutions and, above all – in the author’s view – lacks sufficient basis in the linguistic interpretation and principles of application of the sanctioning provisions.

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Machine Learning in the Validation of IRB Models: Regulatory Aspects of Its Use in the Light of the Positions of the EBA, ECB and KNF

ABSTRACT

This article aims to determine the scope of permissible use of machine learning in validating models used under the Internal Ratings Based (IRB) approach. After explaining the nature of IRB models and their validation process, it describes the regulatory aspects of using machine learning in this process, with particular attention to the development of challenger models. It also discusses the risks and limitations associated with using machine learning models, including the possibility that their predictive performance may deteriorate as a result of concept drift and data drift. The article also considers the significance of explainability in the validation process. It concludes that the applicable regulations permit machine learning to be used as one of the tools in the validation of IRB models. At the same time, the current state of computer science does not support the conclusion that machine learning alone can achieve all the objectives of validation. Consequently, machine learning cannot serve as a functional substitute for the validation process.

Keywords: IRB models, IRB model validation, machine learning, model risk, explainable artificial intelligence (XAI).

JEL Codes: G21, G28, C52, C45, C53

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IRB MODELS

Risk is inherent in banking. It stems from banks' role as financial intermediaries (Zawadzka, 2001, p. 52; Matuszyk, 2008, p. 13); banking involves, among other things, taking on and managing risk (Iwanicz-Drozdowska, 2024, p. 17). Risk is defined either as *"the possibility of failing to achieve an intended objective (or outcome), that is, a deviation below the desired state (a negative approach to risk), or any deviation, whether positive or negative, from the intended objective (a neutral approach to risk)"* (Iwanicz-Drozdowska and Chmielewski, 2024, p. 43), or as objectified uncertainty grounded in measurable indicators, which distinguishes it from uncertainty (Niedziółka, 2018, pp. 305–306). This article adopts the first definition.

Credit risk is one component of banking risk. The literature distinguishes narrow and broad conceptions of this category. In the narrow sense, it means *"the danger that a bank's debtor will fail to repay [...] the loan taken out, together with interest and fees"* (Matuszyk and Ptak-Chmielewska, 2024, p. 67); in the broad sense, it means *"the risk that a transaction counterparty will fail to meet its obligations to the bank, in relation to loans, guarantees, sureties, bankers' acceptances, letters of credit, interbank deposits, debt instruments and over-the-counter derivatives"* (Matuszyk and Ptak-Chmielewska, 2024, pp. 67–68). The following analysis adopts the first conception.

An essential element of managing individual credit risk is assessing creditworthiness, defined as *"the ability to fulfil all obligations under a credit agreement on time and in full"* (Wiatr, 2008, p. 77). This assessment is made, among other things, using models that simplify reality *"through the use of quantitative and expert methods"* (Komisja Nadzoru Finansowego, 2024, p. 13).

Credit risk, including the calculation of risk-weighted exposure amounts, may be measured either using the standardised approach, whose rules are prescribed by legislation and the supervisory authority, or using the Internal Ratings Based (IRB) approach. The latter is based on the assumption that *"a bank is able to assess the scale of the credit risk it takes on with sufficient accuracy. The essence of the IRB approach is the possibility of using internally estimated risk parameters"* (Schab, 2005, p. 93). The legal basis for using the IRB approach is Article 143(1) of Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012 (OJ L 176, 27 June 2013, pp. 1–337, as amended), hereinafter the *"CRR"*. Under this provision, the competent authority permits institutions to calculate risk-weighted exposure amounts using the IRB approach once specified conditions are met.

VALIDATION OF IRB MODELS

Use of the IRB approach entails an obligation to validate the models, that is, to *"assess the model's performance"* (Komisja Nadzoru Finansowego, 2015, p. 8).

The ECB states that validation is intended to *"form an opinion on whether the final rating system [...] meets the regulatory requirements"* (European Central Bank, 2023, p. 15) and to ensure an

effective challenge to the adequacy of model performance and the appropriateness of the rating system (European Central Bank, 2023, p. 16). In turn, the Polish Financial Supervision Authority (KNF) states that “*the primary objective of model validation [...] is to reduce model risk by verifying the correctness and assessing the performance and functioning of the model; identifying areas in which justified improvements may be made both directly to the model itself and to the process by which it is used; making relevant recommendations and assigning appropriate priorities; verifying the quality of implementation of recommendations; and promoting high standards of model management*” (Komisja Nadzoru Finansowego, 2015, p. 39).

The ECB indicates that the validation process uses, among other things, two types of sample. The first, “*performance metric samples*”, involve testing the model so that “*obligors or facilities are assigned to grades or pools and the empirical metrics (e.g. defaults) can be observed to assess the core model performance*” (European Central Bank, 2023, p. 66). The second, “*application test samples*”, involve assigning obligors or facilities to grades or pools when insufficient time has elapsed for the empirical realisations needed to assess the model to be observed (European Central Bank, 2023, p. 66). In practice, this sample entails testing the model on current exposures that are not yet due.

INTRODUCTION TO THE USE OF MACHINE LEARNING

The possibility of using machine learning in the validation of IRB models has appeared in EBA documents since at least 2021. That year, the EBA began consulting European financial-sector entities and issued a paper stating that “*the identified main areas of use are: [...] Model validation, where ML models can be used, for example, as model challengers or for benchmarking*” (European Banking Authority, 2021, p. 13). At that time, the use of machine learning more broadly in relation to IRB models was treated with caution (European Banking Authority, 2021, p. 10), and “*institutions have made the strategic decision to move away from using ML in regulatory areas*” (European Banking Authority, 2021, p. 11).

There is a distinction between basing an IRB model on machine learning and using machine learning to validate an IRB model that is not itself based on machine learning. The distinction is significant, although it is not always made *expressis verbis*. Before drawing a conclusion from a given source, it is therefore necessary to establish whether, and to what extent, that source addresses the former or the latter. For example, the ECB’s publication entitled “*Guide to Internal Models*” devotes an entire chapter to the use of machine learning in relation to internal models; however, that analysis concerns internal models based on machine learning (European Central Bank, 2025, pp. 15–26), which limits the relevance of that source to this article.

In its consultation paper, the EBA identified the principal areas in which machine learning might be used: (a) risk differentiation, (b) risk quantification and (c) model validation. It grouped the remaining areas under the heading “*other areas*”. In light of the distinction set out in the preceding paragraph, areas (a) and (b) concern the use of machine learning within the model

(an IRB model based on machine learning), whereas area (c) concerns its use in the validation process (the IRB model need not itself be based on machine learning).

The follow-up report did not identify areas substantially different from those listed at the outset. In relation to validation, it clarified that “*ML might be used [...] for internal validation purposes*” (European Banking Authority, 2023, p. 20), and that machine learning may be used to “*develop challenger models [...] and for benchmarking purposes in the initial as well as ongoing validation*” (European Banking Authority, 2023, p. 7), and to examine generalisation using out-of-sample and out-of-time data samples (European Banking Authority, 2023, p. 8).

PERMISSIBILITY OF USING MACHINE LEARNING

Legislation does not establish an exhaustive list of techniques that may be used in the validation process. Article 185(c) of the CRR refers broadly to “*other validation tools*”, indicating that the list is open-ended. The same approach is taken in Commission Delegated Regulation (EU) 2022/439 of 20 October 2021, supplementing Regulation (EU) No 575/2013 of the European Parliament and of the Council with regard to regulatory technical standards for the specification of the assessment methodology competent authorities are to follow when assessing the compliance of credit institutions and investment firms with the requirements to use the Internal Ratings Based Approach (OJ L 90, 18 March 2022, pp. 1–66), hereinafter “*Regulation 2022/439*”. Article 12(b), which addresses, among other things, the adequacy of validation methods, provides that “*validation methods [...] are appropriate to the nature, degree of complexity and range of application of the institution’s rating systems and the availability of data*”. This provision likewise does not establish a closed list.

This interpretation is consistent with the ECB’s position that “*all relevant validation techniques are expected to be used*” (European Central Bank, 2023, pp. 23–24). The ECB goes further, stating that institutions are expected to seek out state-of-the-art validation techniques (European Central Bank, 2023, p. 25).

USING MACHINE LEARNING TO DEVELOP CHALLENGER MODELS

IRB models, which are validated using, among other things, performance metric samples, are based on historical data. Even when the accuracy of those data is not in dispute, they may fail to reflect current conditions, which may have changed because of shifts in market circumstances (economic change, amendments to the regulatory environment, a lender’s revised credit policy, changes in borrower behaviour, and so forth). Challenger models can help identify this situation. Comparing the results of the IRB model under validation with those of a challenger model makes it possible to assess whether the IRB model adequately reflects the relationships present in the current portfolio. If the challenger model achieves greater predictive accuracy, this may indicate that the IRB model under validation no longer fits current market conditions.

In these circumstances, the challenger model does not replace the IRB model; it serves as a benchmark.

The KNF notes that “*machine-learning methods have higher (usually noticeably higher) discriminatory power than the standard logistic regression method*” (Komisja Nadzoru Finansowego, 2024, p. 70), which supports their usefulness, particularly since “*machine learning is more empirical [...] and accounts for higher-order interactions that are not specified in advance*” (Komisja Nadzoru Finansowego, 2026, p. 62). The ECB’s consultation found that machine learning was used primarily to develop models for calculating PD; it was used less frequently to calculate LGD, EAD, ELBE and CCF (European Central Bank, 2023, p. 6).

USING MACHINE LEARNING FOR DATA MANAGEMENT

A second area in which machine learning may be used is to support data-quality analysis. The preceding paragraph assumed that the statistical data were accurate; here, the assumption is that they contain errors characteristic of statistical databases.

According to Recommendation W, “*for each material model used, the bank should assess the model’s potential exposure to [...] data risk arising from [...] low-quality input data; deficiencies in processes for data acquisition, processing, aggregation and storage; an insufficient sample size; time series of inadequate length; an inappropriate frequency of data feeds to the model; and an insufficient range of available data to describe the course of the phenomenon*” (Komisja Nadzoru Finansowego, 2015, p. 24).

The KNF notes that “*the use of machine-learning techniques [...] enables effective use of data that are not always structured and come from different, sometimes unconventional, sources*” (Komisja Nadzoru Finansowego, 2026, p. 63). In the same document, the KNF also points to a related risk, noting that “*unbalanced datasets [...] In such situations, machine-learning models may not perform correctly*” (Komisja Nadzoru Finansowego, 2026, pp. 70–71).

THE RISK OF INSUFFICIENT EXPLAINABILITY

Under Article 175(4) of the CRR, “*where an institution uses statistical models as part of the rating process, it shall document the methods used in this respect. Such documentation: (a) contains a detailed description of the theory, assumptions, and mathematical and empirical bases*”. In some cases, the additional requirement in Article 3(1)(d) of Regulation 2022/439 must also be met. It provides that documentation of rating systems must enable “*third parties to examine and confirm the functioning of rating systems and, in particular, to examine and confirm that: [...] (i) the documentation of the design of the rating system is sufficiently detailed to enable a third party to understand the reasoning behind all aspects of the rating system*”. Against this background, the question arises whether validation carried out using machine

learning can satisfy the above requirement, referred to below for brevity as the “*requirement of sufficient detail*”.

It is not possible to determine whether machine learning “*enables an understanding of the reasoning behind all aspects of the rating system*” without drawing on computer science. According to Ch. Molnar, explainable models can be understood only with the aid of additional techniques, whereas understanding interpretable models requires only knowledge of their structure. From this perspective, interpretability may be understood as the extent to which a person can understand why a given system produced a given result; alternatively, it may be understood as the extent to which a person can predict the system’s result (Molnar, 2019, p. 15). Machine-learning systems can be classified by their degree of interpretability, from low to high. As M. Krzysztoń accurately observes, “*for systems that are more difficult to interpret, where an understanding of how they work is required, it is necessary to use additional tools from the field of XAI (explainable AI). A standard approach is post-hoc explainability, i.e. after the model has been trained*” (Krzysztoń, 2023, p. 52).

It is worth considering whether the legal requirement mentioned above, that the reasoning behind all aspects of the rating system be understood, should be equated with interpretability or explainability. It is also uncertain whether, and under what conditions, an explanation obtained with the aid of XAI tools would satisfy the requirement of sufficient detail. This issue remains unresolved in the documents analysed from the EBA, ECB and KNF. For example, the KNF states that “*a model is explainable if its internal workings can be understood by people or if it is possible to justify the model’s result*” (Komisja Nadzoru Finansowego, 2026, p. 72). However, the publication issued by the Office of the Polish Financial Supervision Authority (UKNF) does not expressly specify whether “*justifying the model’s result*” may consist in presenting an explanation generated by an XAI tool, or what requirements such an explanation would have to meet.¹

Following the EBA, it is also worth noting that, when developing machine-learning-based systems, “*unnecessary complexity [...] should be avoided if it is not justified by a significant improvement in predictive power*” (European Banking Authority, 2023, p. 21), so as not to impede the assessment of their explainability.

RISK OF REDUCED PREDICTIVE PERFORMANCE

The literature discusses extensively the risks of using machine learning that may lead to system degradation (Szostek et al., 2023, p. 25). However, some vulnerabilities to degradation do not appear to apply to systems used in the validation of IRB models. This is due, among other things, to the fact that these systems are unlikely to attract potential attackers: they play an

¹ Given the article’s length limits, it is not possible to resolve these issues here. The issues identified in this passage will be addressed in further research, the findings of which will be presented in separate publications.

indirect role and do not directly affect credit decisions. They therefore provide little opportunity for an attacker to monetise their activity. Attacks pose a separate set of risks; given the scope of this article, the following analysis is limited to risks arising from the properties of the models themselves.

Predictive performance may deteriorate without interference by third parties. J. Surma provides a useful analysis of this issue, drawing on T. Mitchell's definition: *"a system is able to learn from experience (E) with respect to the performance of tasks (T), as measured by a performance measure (P), if its performance at task T, as measured by P, improves with experience E. As a result of learning, the system is able to generate a correct response (output) for a given input object"* (Surma, 2023, p. 36). Surma identifies potential consequences of a system's faulty operation, including a decline in classifier quality through *"the generation of false-positive or false-negative errors. This type of attack results in a decline in classification accuracy, which implies reduced confidence in the system (confidence reduction) and, in an extreme case, abandonment of its use. This is due, among other things, to the fact that misclassifications generate real and potential costs (e.g. reputational loss) as a consequence of incorrect decisions or their absence"* (Surma, 2023, pp. 36–37).

A classifier's quality can deteriorate without human intervention. The literature highlights two causes in particular. First, *"data drift"* is a change in the distribution of input data that need not involve a change in the relationship between the input data and the target variable (Gama et al., 2014, p. 44:4). In other words, a model trained on historical data (such as the data used in a performance metric sample) will not perform equally well on a different dataset. Second, *"concept drift"* is a change in the relationship between the input variables and the target variable (Gama et al., 2014, p. 44:4). In the validation of IRB models, this may mean that an estimated parameter has a different predictive meaning under current conditions than it did in the past. For example, a high loan amount may historically have indicated a higher probability of default, whereas today it may reflect elevated inflation and changes in interest rates.

CONCLUSIONS

The analysis at the intersection of legal scholarship and computer science leads to the following conclusions about the scope of machine learning use in the validation of IRB models.

- 1) Analysis of the CRR and Regulation 2022/439, taking account of the positions of the EBA, ECB and KNF, indicates that machine learning may be used as one of the tools in the validation of IRB models.
- 2) The current state of computer science does not provide grounds for concluding that machine learning can, by itself, achieve all the objectives of IRB model validation. Machine-learning models are themselves subject to limitations that affect the reliability of their results.
- 3) Taken together, the normative and computer-science perspectives lead to the conclusion that machine learning cannot serve as a functional substitute for validation.

The analysis also brought to light further issues, allowing at least two research questions to be formulated:

- 1) Whether, and if so under what conditions, an explanation obtained with the aid of XAI tools will satisfy the requirement of sufficient detail referred to in Article 3(1)(d) of Regulation 2022/439?
- 2) Can “*justifying the model’s result*”, as used in the UKNF’s position, consist in presenting an explanation generated by an XAI tool?

Finally, it is worth emphasising the sound guidance in Recommendation W: “*when shaping the validation process, it should be remembered that there is no single universal approach to validation that will always fit the specific characteristics of a bank and the range of models it uses. The way in which tasks arising from the validation methodology (and, at times, tasks extending beyond its strictly specified scope) are carried out should therefore be adjusted flexibly, on a case-by-case basis, to the characteristics of the model*” (Komisja Nadzoru Finansowego, 2015, p. 40). Accordingly, the scope of machine learning use should also be determined on a case-by-case basis, taking account of the objectives of validation, the characteristics of the model, and the specific features of the bank.

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Forced Intermediation in Digital Banking: Financial Security and the Autonomy of Older Bank Customers

ABSTRACT

The article aims to explain the mechanism of forced intermediation in digital banking and its significance for the security and autonomy of older customers. It draws on a critical analysis of the literature, payment-services and accessibility legislation, and institutional documents. The article introduces the original analytical category of forced intermediation, five criteria for identifying it and a four-level classification of third-party involvement. It distinguishes technical authentication, consent to a transaction and the customer's actual agency. Actual agency is assessed in terms of the customer's understanding of the transaction's essential parameters, freedom of decision-making and ability to verify the outcome. On this basis, the article develops a conceptual framework for supported use of banking services and outlines a possible two-stage implementation in Poland: a sectoral standard defining a separate role and profile for the assistant, followed, where necessary, by statutory clarification of access to information, liability and activity-recording requirements. The model distinguishes technical assistance from a power of attorney and leaves the decision and final approval of the transaction with the customer.

Keywords: older people, digital banking, financial autonomy, financial security, digital exclusion, third-party assistance

JEL Codes: G21, G28, J14

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INTRODUCTION

For social and ethical reasons, particular attention should be paid to situations in which an older customer is unable to perform a specific banking activity independently and the bank does not provide a genuinely accessible, secure and equivalent alternative to the digital channel. Reductions in branch networks, fees for some transactions performed at a service desk, automated telephone helplines and the transfer of an increasing number of processes to applications may mean that formally holding an account is not equivalent to being able to exercise independent control over one's money (Latulipe, Dsouza and Cumbers, 2022, pp. 1–13).

Practices that restrict traditional access to banking services in favour of electronic channels may be described as forced intermediation in banking. The term does not refer to financial intermediation provided by a professional entity, but to the necessary involvement of an informal or formal assistant in relations and transactions between an older customer and a bank. The constraint need not be formalised. It may arise from the design of the technology used to deliver the service, such that, without assistance, an older person is effectively unable to use banking services, particularly their own account, or faces disproportionate difficulty in doing so.

The aim of this article is to identify and analyse forced intermediation arising from the spread of electronic distribution channels for banking services and to determine its consequences for the financial security and autonomy of older bank customers. The analysis also distinguishes voluntary support from third-party involvement made necessary by the absence of an accessible alternative. Finally, it proposes solutions capable of reducing older customers' dependence without depriving them of the benefits of modern banking channels.

The article is conceptual and presents an original conceptual framework. It draws on a critical analysis of literature on digital and financial exclusion, older people's use of electronic banking, informal assistance in account management and the financial exploitation of older people. It also considers accessibility and payment-services regulation, institutional reports and secondary data. The study does not present original quantitative or qualitative research and is not a systematic review. Its purpose is to reconstruct the mechanism, organise the relevant concepts and formulate a conceptual framework requiring further operationalisation and empirical verification.

1. DIGITAL AND FINANCIAL EXCLUSION IN BANKING

The literature treats digital inequality as a multi-level phenomenon: inequalities in access, knowledge and skills, modes of use, and the outcomes achieved through technology. For bank customers, relevant factors also include device complexity, connection stability, the sensory and cognitive accessibility of the interface, the ability to understand financial language, a sense

of security, and the possibility of obtaining help without disclosing confidential data. A person with internet access may therefore still be functionally excluded (van Deursen and van Dijk, 2019, pp. 356–360; World Bank, 2022, pp. 127–145).

Financial exclusion means restricted access to necessary financial services or an inability to use them appropriately, safely and in a manner suited to one's needs. As electronic communication channels and digitalisation become widespread, digital exclusion may form part of financial exclusion, although the two concepts are not identical. A customer may hold a bank account and payment card and have formal access to electronic banking, yet still lack a genuine opportunity to perform a particular action independently. Formal access therefore does not guarantee functional access.

Research on older users of banking technologies shows that involving other people, especially people close to them, in financial activities is not unusual. Assistance includes using a device together, explaining messages, carrying out transactions such as transfers, cash withdrawals or opening term deposits, and monitoring an account. Such assistance may be a precondition for using certain services and may strengthen a sense of security. At the same time, banking solutions are generally designed around a single, fully independent user, leaving actual practices of assistance outside the formal architecture of permissions (Latulipe, Dsouza and Cumbers, 2022, pp. 1–13).

From the perspective of financial autonomy, what matters is not only whether a transaction was completed, but also whether it was understood by the decision-maker, who made the decision, who technically carried it out and who could verify the outcome. In this context, autonomy does not mean complete independence or acting without third-party assistance. Financial autonomy may be understood as a continuum extending away from complete independence and encompassing varying degrees of support from one or more persons. Without analysing extreme cases, it means retaining the right to make decisions and control their implementation while receiving support proportionate to one's needs. Assistance strengthens autonomy when it leaves the customer with an informed choice, including the right to refuse or discontinue an action. Autonomy is weakened, and may in fact be lost, when the assistant effectively assumes the role of decision-maker in a financial operation, such as withdrawing funds from an ATM, making a transfer or closing a term deposit.

2. SERVICE ORGANISATION AND THE GENUINE-ALTERNATIVE TEST

The development of digital channels changes the structure of financial-service use and increases the importance of mobile banking. From the perspective of equal access, a problem arises when digitalisation is accompanied by reduced functional access to traditional, physical service alternatives. Statistics on active application users therefore fail to reflect customers who use their bank account only with third-party assistance or who cannot carry out certain activities (European Banking Authority, 2025, pp. 14–23).

Analyses by Narodowy Bank Polski of fees for bank accounts show that the manner in which a transaction is performed is reflected in bank tariff schedules. Differences in fees are not necessarily unjustified or impermissible. For the present analysis, however, the relevant question is whether a particular fee supports a voluntary choice of channel or imposes a higher cost on a person for whom the digital channel is inaccessible and who cannot use an equivalent solution (Narodowy Bank Polski, 2025).

The provisions of the Act of 26 April 2024 implementing the European Accessibility Act have applied in Poland since 28 June 2025. They cover, among other matters, payment services, payment accounts, consumer and mortgage credit, and selected services provided as part of brokerage activity. The Financial Ombudsman supervises compliance with accessibility requirements for retail banking services. The regulation reinforces the move away from treating accessibility as a voluntary convenience (Directive (EU) 2019/882, Annex I, Section III; Act of 26 April 2024, Article 3(1)(30) and Articles 33–35).

For the purposes of the analysis, nominal accessibility is distinguished from functional accessibility. A channel is nominally accessible when the bank formally offers it. Functional accessibility means that a particular customer can use it independently, safely and within a reasonable time to obtain the required service. This distinction prevents the mere existence of a telephone service or branch from being treated as resolving exclusion.

An alternative that is genuinely accessible, rather than merely nominally available, should satisfy at least five conditions. First, it must enable the same or a functionally equivalent action. Second, it should be accessible in terms of location and time. Third, it must not entail disproportionate cost. Fourth, it must provide a comparable level of confidentiality and security. Fifth, it should allow the customer to retain decision-making power and control without disclosing data to an unauthorised person.

3. FORCED INTERMEDIATION AS AN ANALYTICAL CATEGORY

It is insufficient to contrast independence with dependence. A person may act autonomously while receiving support from others. What matters is not cooperation itself, but the allocation of knowledge, decision-making and control. Assistance supports autonomy when it increases the customer's ability to act in accordance with their own will. It restricts autonomy when it replaces that will, cuts the customer off from information or becomes the only route to their funds (Havens and Latulipe, 2024, pp. 1–14; Latulipe, Dsouza and Cumbers, 2022, pp. 1–13).

Forced intermediation in digital banking is a situation in which, because a digital banking service is inaccessible or unsuitable and no genuinely accessible and safe alternative channel exists, a customer must rely on informal third-party assistance to obtain information, confirm identity, make decisions or perform actions concerning their own funds. Intermediation is

forced when forgoing assistance would make the service effectively impossible to use or disproportionately difficult.

The definition of forced intermediation comprises four elements that should occur jointly. The first is a barrier within the process or the manner in which it is made available. The barrier may be digital, sensory, cognitive, communicative, economic or organisational and need not be permanent. Forced intermediation may also arise temporarily, for example after replacing a phone, updating an application, having access blocked or during a deterioration in health.

The second element is the absence of a genuine alternative. If the customer can perform the same action at a branch, by telephone or through another accessible channel without excessive cost, the involvement of someone close to the customer remains, in principle, a matter of choice. If the alternative exists only formally and does not lead to a comparable outcome, it does not qualify as a genuine alternative. The accessibility of an alternative may be assessed by applying an appropriate test that takes account of the criteria discussed in Section 2.

The third element is the necessity of third-party involvement. This does not mean coercion by the assistant. The necessity may arise from the complexity of the service relative to the customer's financial competence. In particular, without another person the customer may be unable to obtain necessary information, complete authentication, execute an instruction or regain access. "Forced" refers primarily to the absence of functional choice, rather than psychological or physical coercion.

The fourth element is the assistant's access to information, de facto decision-making power, or ability to perform a financial action. Transport to a branch or the mere provision of a device does not yet amount to intermediation in the sense adopted here. The phenomenon arises when a third party obtains information and data concerning the bank account, participates in identifying the customer, interprets the customer's decision, operates the application, authorises an action using the customer's instruments or controls the outcome.

Identifying forced intermediation requires analysis of the specific course of action. Five criteria may be applied: the availability of an alternative, freedom of choice, the scope of the assistant's involvement, the customer's retention of control, and the reversibility of dependence. These criteria are not assessed on a simple points scale. A set of questions is needed to determine whether support still enables independent action or has become a condition of access to the service.

3.1. Four levels of third-party involvement

Level one – informational support. The assistant explains concepts, reads a message aloud or indicates the next step, but does not learn authentication credentials or perform the action for the customer. The customer operates the device, makes the decision and approves the transaction. As a rule, this level strengthens autonomy, provided that messages are not interpreted in a way that replaces the customer's will.

Level two – technical support. A third party helps configure a device, locate a function, enlarge the font or navigate the interface. Access to data may be limited, but the assistant is already closer to the banking process itself. Security depends on whether the customer continues to see and understand the actions and retains control over authorisation.

Level three – substitute performance. The assistant enters data, initiates a transfer, operates the application or contacts the bank using the customer's device or data despite lacking formal authority. The account holder may identify the purpose of the transaction, but its technical execution remains in another person's hands. A discrepancy then arises between the actual operator and the person recognised by the system.

Level four – de facto assumption of control by a third party who continuously holds the device, data and information, independently monitors the account, makes payments or decides the order of expenditure. The customer receives only selected information or merely the outcome of that person's actions. Such an arrangement may accord with the customer's wishes, but without necessary formalisation, transparency and control it creates a high risk of abuse.

3.2. ASSISTANCE, POWER OF ATTORNEY AND ASSUMPTION OF CONTROL

A formal power of attorney for banking matters creates a specific relationship between the customer and the assistant. The bank knows the identity of the person acting on behalf of the account holder, can define the scope of that person's authority, and attributes transactions to a formal mechanism of representation. A power of attorney does not guarantee the absence of abuse and does not always meet a need for short-term support, but it reduces the discrepancy between the actual and recorded course of action. Forced intermediation generally occurs outside such an arrangement (Financial Conduct Authority, 2021, paras 4.53–4.60).

The boundary between support and assumption of control is not determined solely by access to a login and password or approval of a transaction. The entire decision-making process – the chain of agency – must be considered: who possesses the information, who formulates the decision, who performs the action, who authorises it and who can verify the outcome. If all these elements fall within the assistant's activity, the customer's presence does not restore effective control.

The proposed category of assumption of control requires answers to three questions: was assistance necessary, was it organised safely, and did the customer retain autonomy? An affirmative answer to the first does not remove the need to answer the other two. Accessible banking should enable necessary support while minimising disclosure of data, recording participants' roles and leaving the decision with the account holder.

Forced intermediation is not equivalent to economic abuse or an unauthorised transaction. It is a mechanism that increases exposure to those risks. The next section examines how a discrepancy between formal authorisation and actual performance affects confidentiality, security, liability and the ability to challenge a transaction effectively.

4. FINANCIAL SECURITY AND THE CUSTOMER'S ACTUAL AGENCY

Forced intermediation reveals the difference between technical and functional security. The former asks whether the appropriate safeguards were applied and whether the system received the required data. The latter concerns the conditions of actual action: who operated the device, who knew the content of the instruction, who made the decision, and whether the owner of the funds could verify the outcome. A transaction may pass every technical check while leaving the customer without effective control.

PSD2 provides that a transaction is authorised only if the payer has consented to its execution. Article 40 of the Polish Payment Services Act adopts the same rule. Use of the correct password, SMS code, biometric identifier or in-application approval is therefore evidence concerning authentication and the technical course of the transaction, but should not automatically be equated with proof of informed consent to that specific transaction (Directive 2015/2366, Articles 64 and 72; Payment Services Act, Articles 40 and 45).

When acting independently, three elements generally coincide: the customer makes the decision, performs the action and uses their own credentials. Forced intermediation distributes these elements between at least two people. The customer may express a general wish to pay a bill while the assistant selects the recipient and amount. The customer may also approve a message that they have not read or whose parameters were entered by someone else. The formal record then fails to reflect the entire chain of agency.

For the purposes of this analysis, three dimensions must therefore be separated. Authentication, defined in Article 2(33b) of the Payment Services Act, asks whether the provider verified the user's identity or the validity of the use of a particular payment instrument, including the use of personalised security credentials. Authorisation in the legal sense concerns the payer's consent to a specific transaction. Actual agency concerns whether the customer knew its essential parameters, shaped the decision themselves, could refuse and could verify the outcome. These dimensions may diverge: the system may correctly authenticate the customer even though the assistant entered the data and the customer approved the transaction without sufficient knowledge of the recipient, amount or consequences. Successful authentication therefore does not establish who actually entered the data or whether the customer independently formed and knowingly confirmed the instruction. Assessing actual agency requires reconstruction of the entire course of action, not merely examination of the technical authorisation trail; this corresponds to Article 45(2) of the Act, under which recorded use of a payment instrument alone is insufficient to prove authorisation.

A payment-instrument user should use it in accordance with the agreement and take the necessary measures to protect personalised security credentials. Keeping passwords, PINs and codes confidential is rational because it impedes third-party access to the account and preserves accountability. Forced intermediation nevertheless creates a paradox. A customer may be unable to complete the procedure independently while the only available means of

assistance requires allowing an assistant, especially someone close to the customer, access to the device, screen or authorisation message (Payment Services Act, Article 42).

Fraud-prevention systems use, among other measures, real-time transaction monitoring based on AI/ML and behavioural biometrics (European Central Bank, 2025, p. 7). Behavioural analysis may consider the manner of interaction with the device and the course of the session. Unusual operation of the account by an assistant may therefore be treated as an anomaly, triggering additional verification or interruption of the transaction. This follows from the operation of anti-fraud tools and the separation between the customer's formal identity and the actual operator. Although the ECB document cited above does not directly address family assistance in banking, this does not justify circumventing safeguards or sharing passwords. On the contrary, it strengthens the case for a transparent and recorded assistant role.

The confidentiality paradox does not justify unrestricted disclosure of data. It demonstrates, however, that merely informing the customer of their obligations may be insufficient if the organisation of the service offers no safe means of obtaining assistance. Information should be combined with solutions that keep the customer's participation visible, limit the assistant's role and record the participation of a trusted person.

When a transaction is disputed, the provider must demonstrate that it was authenticated, accurately recorded and entered in the accounts and that it was not affected by a technical breakdown or other deficiency. Both PSD2 and Article 45 of the Payment Services Act state that recorded use of a payment instrument alone is insufficient to prove that the payer authorised the transaction or intentionally, or through gross negligence, breached their obligations (Directive (EU) 2015/2366, Article 72(1)–(2); Payment Services Act, Article 45(1)–(2)).

Forced intermediation may weaken the customer's position even before a dispute arises. A person who does not operate the account independently may detect an irregularity after a delay, be unaware of the transaction date or lack access to the account history. They may also depend on the same assistant when filing a complaint, changing a password or securing the account. If the assistant is the potential perpetrator, that dependence hinders both detection and reporting (Payment Services Act, Article 46(1)–(4)).

For security assessment, the article proposes analysing a chain of agency comprising five successive elements: access to information, formulation of the decision, technical preparation of the transaction, expression of consent and control of the outcome. In the independent model, all elements remain with the customer. In a supported model, the technical component may be entrusted to an assistant, but the decision, consent and ability to verify should remain with the owner of the funds.

The highest risk arises when the assistant possesses the information, formulates the decision, performs and approves the transaction, and is then the only person controlling the account history. The banking system may nevertheless attribute all activity to the customer. The fundamental importance of forced intermediation for financial security emerges precisely in this gap between the technical record and the actual allocation of roles.

5. AUTONOMY AND THE RISK OF FINANCIAL EXPLOITATION

Third-party assistance with banking transactions is not the opposite of autonomy. It may strengthen autonomy when it removes a technical barrier, leaves the decision with the customer and enables the customer to understand and verify the action. This is consistent with supported decision-making: support should serve the person's will and preferences rather than replace them with the assistant's assessment of the customer's best interests (Convention on the Rights of Persons with Disabilities, Article 12; Committee on the Rights of Persons with Disabilities, 2014, paras 17–29).

Where the absence of an assistant effectively cuts the customer off from the service, the dependence is infrastructural. It may arise in various circumstances in which the customer cannot act personally, for example because they cannot physically contact the bank or cannot reach an assistant or authorised representative. If only one person is familiar with the assistance procedure – for example, knows how to log in, keeps the device, receives correspondence and controls the account history – the owner's continuing ability to use the account depends on that person's availability and, importantly, goodwill. The risk of losing access then results from concentrating functions in one person, even in the absence of abuse.

The World Health Organization defines abuse of older people as a single or repeated act, or failure to act, occurring within a relationship in which there is an expectation of trust and causing harm or distress; the concept includes financial and material abuse. Financial exploitation is the illegal or improper use of an older person's money, property or assets. The essence is therefore not another person's involvement as such, but conduct contrary to the owner's will or interests, abuse of trust, benefit to the perpetrator or the infliction of harm (World Health Organization, 2024).

Forced intermediation is not itself a form of abuse, but it increases exposure to risk: both because of dependence on the assistant and because the assistant may abuse the dependent person's trust. The situation may become more serious when the dependent person is reluctant to disclose abuse or fears the consequences of doing so, such as losing the only available support, family conflict or scandal, loneliness, or revealing their lack of competence or frailty (Phelan, O'Donnell and McCarthy, 2023, pp. 2135–2156).

An ageist assumption that an unusual or disadvantageous decision by an older customer proves third-party exploitation must also be avoided. Autonomy includes the right to take risks, make gifts and make choices that others disapprove of or do not endorse. Protective intervention should be based on signs of pressure, absence of informed consent, concealment of information, a conflict of interest or harm, rather than solely on age or an assessment of the decision's rationality (Wood and Lichtenberg, 2017, pp. 3–13).

Informal involvement by an assistant may also have consequences that emerge only after the account holder's death. If one person prepared or executed transfers without a separate

profile or a formal record of the scope of assistance, heirs may be unable to determine which transactions implemented the older person's instructions, which were gifts and which lacked a basis in the owner's will. This creates a risk of disputes over accounting for funds that were transferred or otherwise used, bringing gifts into account when determining an heir's share or calculating the reserved share (zachowek), and obligations to return funds or provide an account of the actions performed. The risk arises not from family assistance itself but from the failure to separate identities, roles and the decision trail. A recorded assistant role would therefore protect not only the customer's current security but also subsequent civil accountability (Civil Code, Articles 6, 405, 740, 922, 993 and 1039; Financial Ombudsman, 2021, pp. 7–10).

Conversely, complete neutrality towards visible signs of pressure is also inappropriate. A proportionate protection standard should begin with a conversation with the customer in the absence of the third party, provision of information in an accessible form, verification that the specific action is understood, and an offer of a safe channel for further contact. Only the level and credibility of the risk may justify additional safeguards provided by law and contract.

The analysis identifies six conditions for a safe assistance relationship: voluntary choice of assistant, minimal access, separation of support from decision-making, transparency of every action, independent verification of the outcome, and easy revocation of permission or reversal of dependence. These conditions develop the earlier criteria for forced intermediation and apply them directly to the protection of autonomy.

6. A STANDARD FOR SAFE AND ACCESSIBLE BANKING

Directive (EU) 2019/882 and the Polish Act of 26 April 2024 implementing it cover retail banking services and require information and interfaces to be perceivable, operable, understandable and compatible with assistive technologies. These obligations, applicable since 28 June 2025, are an important starting point. They do not, however, exhaust the problem of forced intermediation, because compliance of an individual interface does not determine the actual accessibility of a branch, telephone service, complaints procedure or recovery of access to an account (Directive (EU) 2019/882; Act of 26 April 2024).

The proposed standard rests on four equal values: accessibility of the entire process, preservation of the customer's agency, minimisation of third-party access and accountability for every action. A bank should not require a choice between independence and security. A customer who needs support should be able to use it transparently and under control, without compromising the confidentiality of their data and without the fiction that they personally performed every technical action.

The first element of the standard is at least one genuinely accessible alternative channel. This does not require identical procedures in every channel, but it does require the customer to be able to achieve the same material outcome without disproportionate cost, effort or delay.

A branch dozens of kilometres away, a telephone service based solely on an extensive voice menu, or a charge for an operation that is free in the application may formally exist without constituting an equivalent alternative.

An accessible interface should offer clear language, enlargement of content, appropriate contrast, compatibility with assistive technologies, sufficient response time and error messages explaining how to correct the problem. For older customers, reducing time pressure, maintaining a stable layout, clearly naming the effect of an operation and enabling safe return to the previous step are particularly important.

Digital banking needs an intermediate solution between entirely independent access and a conventional power of attorney authorising another person to operate the account. A safe assistant role should be established with the customer's informed consent, limited in scope and time and capable of immediate revocation. The assistant could, for example, explain messages, prepare a draft transfer or help assemble documents, but should not automatically acquire the right to give final approval. A reference point for formally recording the limited role of a trusted person is the trusted-contact solution described by the US Consumer Financial Protection Bureau (CFPB). It is narrower, however: designation of a contact person does not itself grant access to the account or authority to conduct transactions without separate authorisation (Consumer Financial Protection Bureau, 2021, pp. 1–4).

It is desirable for the system to recognise the separate identities of the customer and the assistant. Each participant would use their own authentication credentials, and the history would identify who prepared, modified and approved the action. This would reduce password sharing, align the technical record with the actual allocation of roles and facilitate complaint handling. Research on proxy accounts indicates that existing tools often fail to accommodate flexible, everyday forms of support for older people (Havens and Latulipe, 2024, pp. 1–14).

Technical support is consistent with autonomy only when the customer retains the decision, understands the essential parameters and can independently approve or reject the transaction. Before authorisation, the bank should present, in an accessible form, at least the recipient, amount, fee, timing and irreversible consequences. Confirmation cannot be merely an automatic gesture performed at the assistant's direction.

A bank should have a procedure for identifying signs of possible financial exploitation, but its activation cannot depend on age alone. Relevant circumstances include a sudden change in transaction patterns, restriction of the customer's ability to speak freely, lack of knowledge of the balance, the assistant's conflict of interest, loss of the customer's own device or contradictory information about an instruction (Consumer Financial Protection Bureau, 2016, pp. 17–29).

6.1. Practical implementation of the model in Poland

The proposed conceptual framework may be implemented at two complementary levels. At sectoral level, a standard adopted by the Polish Bank Association or a code of good practice could define a voluntary assistant role distinct from a power of attorney, with a dedicated assistant profile, a defined scope of permissible actions, an activity record and a procedure for withdrawing consent. At statutory level, clarification might be needed principally in relation to liability, the legal significance of an action prepared by the assistant, access to information covered by banking secrecy and the use of the activity record in complaint proceedings. The aim would not be to create a new form of legal capacity or representation, but to regulate technical assistance in which the customer retains the decision and final approval of the transaction.

At the first stage, the bank could define in the account agreement and terms and conditions a voluntary assistant role that would confer no right to dispose of funds independently. Once identified by the bank, the assistant could explain messages, enter data or prepare a draft instruction. Establishing the role should include identification of both persons, the customer's consent in an accessible form, definition of the scope and duration of support, separate authentication credentials for the assistant, a record of the assistant's actions and an independent notification to the customer. The customer should be able to suspend or withdraw consent immediately through any channel. If the customer wished to grant a third party the right to submit legally effective instructions, a power of attorney would remain the appropriate solution.

The technical layer of the framework could separate preparation from approval of an instruction. Using their own profile and credentials, the assistant would prepare a draft operation within the granted authority. On their own device, the customer would receive an accessible and clear summary including at least the recipient, amount, fee, timing and effect, and would then independently approve or reject the instruction. The system would record separately the actions of the assistant and the customer. This solution would not require disclosure of the customer's passwords, codes or other personalised security credentials and would therefore not depend on creating an exception to the obligations under Article 42 of the Payment Services Act.

The assistant's access to banking information should be granular and correspond to the scope of support. Article 104(3) of the Banking Law already permits information covered by banking secrecy to be disclosed to a third party on the basis of authorisation granted by the person to whom the information relates, including authorisation given electronically and recorded by the bank. The proposed model should develop this possibility by defining the visible data, duration and revocation of access, liability for an action prepared by the assistant, the evidential significance of the activity record and complaint rules. If the assistant's role were to extend beyond preparation to independent initiation of transactions or submission of legally effective instructions, an appropriate contractual or statutory basis would be necessary. The solution could first be standardised through a sectoral standard and, following evaluation in practice, incorporated into payment-services or banking legislation.

7. RESPONSIBILITY OF BANKS AND SUPERVISORY AUTHORITIES

Responsibility for limiting forced intermediation should not be confined to compliance or digital accessibility. It should also encompass product design, security, complaints, the branch network and customer protection. Every material change to a process – especially moving an activity to an application, limiting branch service or introducing an additional fee – should be preceded by an assessment of whether a customer with particular needs can still deal with the matter independently or use transparent and safe support. The risk of informal intermediation should be treated as a design and operational risk, not merely as the customer's and family's private problem.

Assessing the effects of digitalisation also requires measures other than the number of active application users. Useful data include abandoned processes, repeated blocks and access recovery, waiting times in alternative channels, complaints submitted with third-party involvement, and matters that cannot be completed without moving to the application. These indicators should be analysed in aggregate and with respect for privacy, without automatically labelling a particular customer as dependent. Their purpose is to detect barriers in service organisation, not to profile older users on the basis of age.

Supervisory and consumer-protection authorities should assess the accessibility of the entire service journey, not merely formal interface compliance. Comparable indicators of channel accessibility, complaint analyses and mystery-shopping studies involving people with diverse needs would be justified. A minimum standard for safe assistance should define how the assistant role is established and revoked, its powers, separate authentication credentials, the record of activities and independent notification to the account holder. The EBA report indicates that digitalisation and reductions in branch networks may impede access to financial services for vulnerable groups, including older people (European Banking Authority, 2025, pp. 14–23).

The target model may be described as a transition from informal substitution of the customer to supported use of services. The customer retains direct access to information, the decision and final confirmation; the assistant acts in a separate, limited role; and the bank records the actual allocation of actions while providing an alternative channel and independent verification of the outcome. Every element of support is voluntary, proportionate and revocable.

CONCLUSION

The analysis answers the principal research question: the organisation of digital banking services makes an older customer's reliance on informal third-party assistance necessary when a barrier in the digital channel coincides with the absence of a genuinely accessible, safe and functionally equivalent alternative. Neither age alone nor the absence of a particular skill determines the phenomenon. What is decisive is the relationship between the particular customer's capabilities, the design of the banking process and the scope of the assistant's involvement.

The original result of the study is the identification of forced intermediation as an analytical category situated between voluntary assistance and formal substitution. It occurs when four elements coincide: a barrier to using the service, no genuine alternative, the necessary involvement of an informal third party, and that person's entry into the sphere of information, decision-making or performance of a financial action. Five diagnostic criteria – the availability of an alternative, freedom of choice, scope of the assistant's involvement, retention of control and reversibility of dependence – avoid both trivialising the problem and mistakenly treating every form of family assistance as a violation of autonomy.

Forced intermediation is not in itself economic abuse or evidence of disloyalty by the assistant. It may nevertheless create conditions conducive to exploitation, particularly when one person gains continuing access to the device, data, account history and capacity to approve transactions while the customer loses independent insight into the outcome. Protection against this risk should strengthen the older person's decision-making agency, not replace it with paternalistic control based solely on age.

The proposed conceptual framework has limitations. Above all, it does not diagnose the scale of forced intermediation in Poland or the frequency of the different levels of third-party involvement. The diagnostic criteria are not yet a validated measurement tool, and the proposed solutions require legal, technical and empirical evaluation. The diversity of older people, banking models and relationships with people close to them calls for caution in generalising the conclusions.

Ultimately, the measure of inclusive digital banking is not the number of services available in an application, but the customer's ability to remain informed about their financial position, make decisions about the use of their funds and retain control over their own money. Digitalisation strengthens autonomy when it expands choice. When the only route to a bank account becomes informal access through another person, it may create a new and hidden dependence. Identifying forced intermediation makes it possible to name, assess and limit that dependence without abandoning the benefits of technology or diminishing the importance of voluntary assistance from people close to the customer.

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Moral Panic and its Manifestations in the Polish Banking Sector

ABSTRACT

This paper aims to characterize the sociological concept of “moral panic” and its constituent elements, and to apply the concept’s structural framework to analyze the emotions and disputes surrounding mortgage agreements denominated or indexed in Swiss francs (CHF). It focuses specifically on manifestations of moral panic in the context of social media – acting as an accelerator of stakeholder emotions – and their impact on the stability of banking sector entities. The primary method employed is a literature review, grounded mainly in the theoretical frameworks of Cohen and Garland, supplemented by synthetic case studies of two banks and the Polish banking sector regarding the issue of CHF-denominated loans. The analysis demonstrates that moral panic can spread in a “contagious” manner and be accelerated by the media – particularly social media – thereby shaping a strongly negative image of lenders (often labeled “banksters”) while simultaneously generalizing the grievances of borrowers and casting them as victims. The widespread nature of this moral panic regarding the banking sector also exerts social pressure on politicians and policymakers to alter regulations. The Swiss franc loan crisis in Poland exemplifies how a dispute between parties to credit agreements transformed into a moral crusade with lasting institutional consequences; a potential side effect is the destabilization of the system or isolated instances of liquidity loss leading progressively to insolvency.

The experiences and potential consequences of moral panic in the financial sector should serve as a basis for establishing a framework to manage this phenomenon and, above all, for fostering effective public financial literacy.

Keywords: moral panic, banking sector, social media, Swiss franc loan crisis

JEL Codes: G21, G28, D84

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INTRODUCTION

The banking sector is a component of the financial system characterized by rapid technological and institutional change; due to its inherent fragility – stemming from high-leverage intermediation processes – it is exposed to a relatively high risk of crises. Several factors contribute to this sector being the most heavily regulated: its importance for the efficient circulation of funds within the economy; the transformation of maturities and risks when using depositors' funds (which often enjoy statutory guarantee protection) to grant loans; and, finally, historical experience with banking crises. Furthermore, the development of the financial market – encompassing non-bank institutions – means that banks operate in a highly competitive environment. The links between financial market entities and policymakers, as well as the impact of these entities' activities on customer attitudes and financial standing, lead to varied reactions from decision-makers and shape legislative outcomes. Examples from recent decades include the liberalization of cooperative banking activities in the early 1990s, the delay in bringing Cooperative Savings and Credit Unions (SKOKs) under the supervision of the Polish Financial Supervision Authority (KNF), disputes regarding restrictions on foreign-currency or foreign-currency-indexed loans, the issue of the bank levy, and the status of WIBOR as a benchmark parameter in loan agreements. Strict regulation means that banks are sensitive to the decisions of politicians and, indirectly, to the *vox populi* – reflecting the public sentiments of financial institution clients, particularly borrowers, depositors, and investors. Experience – not only domestic – shows that such client emotions spread rapidly among the masses (exhibiting high contagiousness). Modern electronic communication tools act as accelerators for this spread of sentiment within the social sphere. The crisis involving three US banks in the first quarter of 2023¹ provides compelling evidence of how quickly an epidemic of fear regarding funds entrusted to banks can spread (Michalewicz, 2024; Miklaszewska, 2023).

Negative emotions that translate into mass behavior – especially when backed by politicians, often driven by populism – form part of a “moral panic” and can severely harm individual entities or, in certain situations, the entire financial services sector. Moral panic is a classic sociological concept describing a situation where society reacts with excessive fear, outrage, or hysteria to a phenomenon perceived as a threat to moral values or social order.² This reaction is disproportionate to the actual risk, and the phenomenon is blown out of proportion by the media, politicians, or interest groups. In the modern era, moral panic is strongly linked to content published in the media. Furthermore, regarding the banking sector, the historically rooted stereotype of usury – and, in modern times, the perception of banks and bankers as excessively wealthy and prone to unfairly exploiting clients – plays a significant role. Despite the immense progress made in Polish banking following the systemic transformation, the

¹ In March 2023, three banks went under: Silicon Valley Bank (SVB), Signature Bank (SB), and First Republic Bank (FRB). The direct cause was a sudden outflow of deposits, especially those not covered by FDIC insurance, through electronic channels.

² The concept was created by British sociologist Stanley Cohen. Moral panic arises at the intersection of the media, public opinion, interest groups, and authorities.

stereotype of the “bankster” has become entrenched in the public consciousness, particularly in the wake of disputes concerning foreign-currency-denominated loans.

It is worth noting that moral panic in Poland – specifically regarding the financial system, though not limited to it – is moderated by two factors: the level of public trust in the system (banks were previously widely regarded as institutions of public trust) and the legislative framework and specific prudential regulations (details of which are generally unknown to the average consumer).

The aim of this paper is to characterize the phenomenon of moral panic and to provide a concise analysis of its impact on the situation of banks and the overall health of the banking sector in Poland.

The article is based on a review of the literature. The first section analyzes the concept of moral panic and its constituent elements; the second examines the role of social media in its propagation and briefly discusses the “Swiss franc loan crisis” in Poland; the final section presents a summary and recommendations.

MORAL PANIC – DEFINITIONS AND DISTINCTIONS

Moral panic is a concept introduced by Cohen (1972) and operationalized by Goode and Ben-Yehuda (2009) through criteria such as the disproportionate nature of the reaction or the identification of “scapegoats.” Linked to the concept of moral panic is a line of inquiry stemming from the theories of Kahneman and Tversky (1979). This approach incorporates neuroeconomic research demonstrating that affective states directly influence risk-taking propensity. Meanwhile, Shiller (2019), through his concept of “narrative economics,” demonstrated how fear-based narratives that spread virally shape financial crises.³

Classic models of bank runs (Diamond and Dybvig, 1983) assumed a slow diffusion of information. Modern media and communication networks, however, have come to act as accelerators of crises. Research by Cookson et al. (2023) demonstrates that social media radically accelerates this process, with the 2023 Silicon Valley Bank crisis serving as a near-perfect example.

As Anita Howarth (2013) notes, both moral panic theory and contemporary theories of the “risk society” analyze how threats are socially constructed amidst heightened or exaggerated anxiety. Both assign a central role to the media in the relationships between power, public opinion, and interest groups.

³ Narrative economics is about studying how stories – popular, socially shared tales about the economy – influence people’s economic decisions and the course of macroeconomic phenomena. This approach, developed by Robert Shiller, treats narratives as “contagious” phenomena that spread like epidemics and shape the expectations, moods, and behaviors of consumers, investors, and policymakers.

From the standpoint of scientific precision, the lack of a unified definition for this complex phenomenon presents a challenge. Stanley Cohen's definition holds a relative advantage in terms of substance. He defines moral panic as a state in which a phenomenon – or a set of phenomena – is portrayed by the media as a threat to societal values in a stereotypical and disproportionate manner, thereby mobilizing interest groups (including experts, journalists, and politicians) to formulate diagnoses and propose solutions. Some panics fade away, while others – as Cohen (2002) puts it – have “more serious and long-lasting repercussions in the form of legal and institutional changes.” Scott P. Hier (2020) views moral panics as fleeting episodes within long-term projects of moral regulation. In his view, it is precisely through the process of assigning meaning to social phenomena – discursively articulated as “us versus them” – that moral panics construct social subjectivities and identities, both for the “other” and for the self.

We are thus dealing with a phenomenon that occurs within a system where so-called “significant others” or opinion leaders influence the legislative and executive branches to regulate phenomena they deem harmful to a specific social group. It should be noted that the proposed regulations or restrictions regarding the phenomenon in question do not aim to serve the common (general) good but rather favor the particular interests of a specific group.

Based on two criteria – motives and access to power – Goode and Ben-Yehuda formulated three models of moral panic formation:

- the grassroots model – here, the moral panic originates with ordinary citizens and manifests as intensely felt social anxieties that exert pressure on organizations, mass media, and political groups, which then serve as channels for expressing public sentiment;
- the elite engineering model – the moral panic results from the actions of individuals or interest groups that incite and sustain societal fears or dissatisfaction regarding a specific phenomenon – one that poses no real threat to social order – thereby diverting attention from an actual problem whose resolution would threaten the interests of the elite;
- the interest group model (as the initiator of anxiety) – which posits that various interest groups (media, organizations, religious groups, police, academic institutions... ..or educational bodies, professional groups, etc.) independently generate and sustain a moral panic, which is perceived by the aforementioned groups as a reaction to a threat to the social order (Zielińska, 2004, p. 167).

Following David Garland, one can posit that the narrative surrounding the phenomenon and the description of the “spiral effect” – generated by the reactions of the media, public opinion, interest groups, and authorities – are of key importance to moral panic (Garland, 2008, pp. 19–21).

Erich Goode and Nachman Ben-Yehuda identify five essential elements of moral panic:

- 1) concern – there must be an awareness that the behavior of a given group or category could negatively impact society and disrupt social order;
- 2) hostility and animosity – directed at a specific group singled out from society due to its distinctiveness, creating a symbolic “us vs. them” division;

- 3) general consensus – whether within society at large or a specific social group – that another segment of society or another group poses a very real threat to the collective;
- 4) disproportionality – a significant disparity exists between the grounds for the moral panic and the actual threat posed by the phenomenon in question;
- 5) volatility – the phenomenon of moral panic is highly unstable and can dissipate as quickly as it emerged (Goode and Ben-Yehuda, 2009).

Most changes in financial markets are accompanied by a high level of public concern – particularly those perceived as detrimental to the clients of financial institutions, and especially those seen as threatening a crisis or entailing severe consequences or financial losses.⁴ The emergence of problems, the publicizing of heightened risks, or even the realization that one's situation could be improved through litigation against the other party to a contract, all fuel a growing sense of hostility or hatred toward the institutions representing financial markets – namely, banks. Such hatred can give rise to initiatives like “Occupy Wall Street,” the Association of Those Wronged by the Banking and Legal System, the Association to Stop Banking Lawlessness (SBB), and other forms of social unrest. The generation of intense emotion fosters actions that are disproportionate to the perceived grievance. The realization of a wrong – referred to by Cohen as “sensitization” – is often accompanied by a near-hysterical public reaction to the phenomenon in question. This can occur even in response to a minor disturbance that suddenly finds itself at the center of media or law enforcement attention. Earlier perspectives posited that the media and state institutions, by highlighting behaviors that deviated from social norms, exploited panic to build public support for stricter controls (Ungar, 2001, p. 280). Today, the range of actors involved in moral panics is broader. Stanley Cohen (2002) identifies four groups of actors whose activities should be analyzed in the study of moral panic:

- public opinion,
- law enforcement agencies,
- politicians and legislators,
- activists (action groups).

Cohen describes the last of these groups as “moral entrepreneurs” who act on behalf of public opinion, claiming the right to identify deviants and define their behavior as a violation of public morality, while presenting their own involvement as an expression of concern for the community's dominant values and safety (Cohen, 2002). Activists typically take action in coalition with other actors in the public sphere.

As Stanisław Wargacki (2009, p. 15) writes: “A moral panic requires a collective scapegoat – whether real or imagined – who embodies and symbolizes evil and becomes the object onto which collective fears are projected; a monster of the human imagination. The image

⁴ When there's no unrest in the banking market, depositors rarely pay attention to the deposit guarantee system. But when there's news or even just rumors about potential problems in banks, customers actively use the Bank Guarantee Fund's call center or ask bank employees about the safety of their money in their accounts.

of this personified evil is shaped by television and radio programs; the press writes about it, stirring collective memory and stereotypes.” The target of a moral panic need not possess any predetermined characteristics.

Criticism of the moral panic concept focuses on several key limitations that undermine its analytical utility. The central premise of the moral panic concept is that the societal reaction is disproportionate to the actual threat (Cricher, 2008, p. 1130). Critics point out the lack of objective criteria for determining what constitutes a proportionate societal reaction, noting that assessments of proportionality are made from specific social and cultural perspectives (Cornwell and Linders, 2002).

Sheldon Ungar (2001) observes that the concept of moral panic is rooted in liberal assumptions regarding rationality and proportionality. He introduces the notion of “rational panic” – a reaction that, in the long run, proves to be a valid warning. According to Ungar, certain reactions classified as moral panics may constitute justified responses to real threats, particularly when the difficulty of assessing long-term consequences is taken into account. Reactions deemed “panicky” at one point in time may prove to be accurate from a historical perspective.

Critical observations regarding the concept of moral panic do not imply its outright rejection; rather, they highlight the need for a more reflexive and contextual approach to its application in social analysis.

THE ROLE OF SOCIAL MEDIA IN AMPLIFYING MORAL PANICS

Moral panic, as a sociological phenomenon, is characterized by a sudden surge in collective anxiety regarding a perceived threat to societal values – a threat often exaggerated by the media (Cohen, 2002). Social media platforms (e.g., X, formerly Twitter) act as catalysts for the spread of contagious emotions among audiences – often collective ones – triggered by published information, even when that information is false. In societies where social media plays a pivotal role in shaping public opinion – including Poland – the amplification of such panics is particularly evident in the financial sector. Examples include currency crises or conflicts between borrowers and banks regarding Swiss franc-denominated loans. Online platforms and social media accelerate processes described in established theories – such as Garland’s (2008) media spiral. This refers to a mechanism wherein the societal reaction to deviance leads to its further escalation rather than its containment (Wilkins, 1964; Hall et al., 1978). In financial markets, the aggregation of public sentiment creates a risk of destabilizing market entities.

Social media – including X/Twitter – amplify moral panics through algorithmic mechanisms that promote emotional and viral content; this fosters “echo chambers” and facilitates the rapid spread of anxiety (Walsh, 2020). A prime example is found in social media discourse where ordinary users, influencers, and politicians popularize negative narratives about specific entities or professional groups. This is clearly evident in the widespread use of terms like “banksters”

or “systemic fraud” regarding customer-bank relations – rhetoric that demonizes financial institutions and triggers negative collective reactions. For instance, regarding Swiss franc mortgage holders – a group of borrowers affected by the appreciation of the CHF – X/Twitter serves as a platform for organizing protests, sharing personal stories of grievance, and calling for bank boycotts. Posts highlighting the plight of these borrowers and emphasizing bank culpability (e.g., *Życie Bez Kredytu*, 2021) stoke emotions, creating a dichotomy between the aggrieved (victims) and the perpetrators (“tormentors”), a dynamic that embodies the hostility inherent in moral panics. ...moral panic (Goode and Ben-Yehuda, 2009).

Regarding financial sector institutions, social media can trigger deposit runs, as rumors about bank instability lead to mass withdrawals, thereby reducing the liquidity of the threatened institution. However, mass withdrawals at a single bank or within a segment of the sector do not necessarily destabilize the entire system; the scale of the threat depends on the central bank’s and the financial safety net’s capacity to maintain liquidity, as well as the sector’s overall reserve levels. Zielińska (2004, pp. 166–167) emphasizes that the media – including social media – generate panic in response to threats to social order, diverting attention from real problems.

In financial risk theory, drawing on the concept of the “risk society” (Beck, 2002), economic uncertainty (e.g., currency fluctuations, inflation) intertwines with moral panics to create a spiral of destabilization (Garland, 2008, pp. 13–16). Garland analyzes this within the context of a media spiral: the media, public opinion, interest groups, and authorities feed off one another, triggering moral threats that lead to disproportionate reactions (e.g., hasty regulations). In Poland, social media accelerate this spiral by integrating emotions with financial risk. Polish analyses – particularly in the context of penal populism⁵ – show that social media reinforce the spiral by dramatizing events or entities (including the use of epithets directed at banks, personalizing them with terms such as beasts or “banksters”) and attributing systemic characteristics to risk (Karaźniewicz and Kotowska, 2011, pp. 50–55). Consequently, moral panic surrounding the financial sector increases systemic risk. A recent example involves fear-mongering on the X platform regarding Putin or high inflation, which can lead to declines in Warsaw Stock Exchange (GPW) indices or a weakening of the zloty (Borowski and Jaworski, 2024, pp. 33–45).

Polish studies indicate that social media amplify panics through interactivity: comments, retweets, and hashtags facilitate mass calls for aggressive behavior – such as a media-driven public outcry against “banksters” (Juza, 2015; Naruszewicz-Duchlińska, 2015). Another example is the currency panic that followed a Russian hybrid warfare campaign involving the dissemination of false information on social media in Poland (Mroccka, 2022, p. 111). Similarly, in 2022, following the Russian invasion of Ukraine, panic regarding fuel, medicines, and bank withdrawals – fueled by online rumors or fake news – exhibited the hallmarks of a hybrid attack, with social media serving as a channel for spreading public anxiety (Singer and Brooking, 2019). These examples illustrate the process of mass emotional contagion in the digital environment,

⁵ Penal populism means making and toughening criminal law based on emotions, public opinion pressure, and media narratives, rather than on solid expert analysis or criminological data.

where a single post can generate thousands of interactions, escalating fear on a massive scale (Vosoughi et al., 2018).

Zielińska (2004) emphasizes that the media – in their newer, social-media-based forms – generate panic in response to perceived threats to the social order, thereby diverting attention from genuine structural problems. The “deviance amplification spiral⁶” mechanism – originally described by Wilkins (1964) and further developed by Hall and his colleagues in their analysis of the panic surrounding street crime – demonstrates how sensationalist media coverage triggers social and institutional reactions that, in turn, intensify the very phenomenon perceived as a threat (Hall et al., 1978⁷). Similar processes have tangible economic consequences in the financial sector. Following Russia’s invasion of Ukraine in February 2022, media narratives regarding the threat to Poland coincided with a sharp depreciation of the zloty; the EUR/PLN exchange rate exceeded 4.65, and investor panic led to sell-offs on the Warsaw Stock Exchange (WSE) as well as currency intervention by the National Bank of Poland (Forsal, 2022; Parkiet, 2022). Garland (2008) emphasizes that moral panics can have institutional repercussions driven by pressure to tighten regulations or alter public policy. This mechanism can be observed in areas such as monetary policy and financial supervision. In summary, social media act as a catalyst for the spread of contagious emotions (Vosoughi et al., 2018). In the context of the Polish financial sector, these media outlets stimulate or amplify moral panics by linking the classic media spiral (Hall et al., 1978; Garland, 2008) with a heightened public perception of risk and potential harm (Beck, 2002). In particular, this can lead to so-called... a run by depositors on a bank or banks, fluctuations in the zloty’s exchange rate against foreign currencies, or even hasty regulatory reactions.

MORAL PANIC AND DEPOSIT RUNS ON IDEA BANK AND GETIN NOBLE BANK

The financial condition of Idea Bank and Getin Noble Bank during the latter half of the 2010s was a matter of particular concern for financial safety net institutions, partly due to mounting operating losses. While the deterioration of these banks’ standing was not common knowledge among the general public, it was impossible to conceal within banking circles and among financial experts. In November 2018, a liquidity crisis emerged at Idea Bank and Getin Noble Bank following a rapid outflow of funds. This outflow occurred via both electronic banking channels and branch withdrawals; however, the lack of publicly available data on the breakdown of these channels makes it impossible to definitively classify the phenomenon as a “digital”

⁶ In sociology, the spiral of reinforcing deviance happens in societies or social environments when attempts are made to eliminate slightly deviant or criminal behaviors by labeling and shaming them in a way that ultimately furthers the marginalization of people seen as deviant and leads them to engage in more deviant behavior, which in turn increases social disapproval and keeps the cycle going.

⁷ Analyses of penal populism in Poland show a similar mechanism – the media act as the main channel shaping punitive feelings towards certain groups (Karaźniewicz and Kotowska, 2011). Penal populism is the shaping of criminal laws under the influence of emotions and the media, without taking expert opinions into account, characterized by harshness and a lack of sympathy for offenders.

deposit run in the strict sense. At the time, the crisis was directly caused by the outflow of deposits following media revelations regarding a confidential recording of a conversation between the banks' controlling shareholder, Leszek Czarnecki, and the Chairman of the Polish Financial Supervision Authority, Marek Chrzanowski. It is worth noting that the financial health of both banks had already raised concerns among safety net institutions, and both had been implementing recovery plans since 2016. Threats to their solvency stemmed from factors such as a toxic portfolio of Swiss franc-denominated loans, legal risks, mounting losses, and liquidity issues, as well as supervisory actions that triggered a reputational crisis and, ultimately, a deposit run.⁸ Liquidity support from the NBP made it possible to temporarily stabilize the situation, yet it did not eliminate the structural causes of insolvency risks.

In the context of moral panic, it is important to highlight the significance of the published details regarding the conversation between L. Czarnecki and M. Chrzanowski – information that was disseminated not only through traditional national media outlets but also widely across social media.⁹ In 2018, Idea Bank recorded a loss of approximately PLN 1.9 billion, and its capital ratios plummeted to 2.5%, falling well below prudential requirements. Following 2018, Idea Bank entered a downward spiral that culminated in the announcement of a compulsory restructuring process on December 30, 2020, and the acquisition of Idea Bank's business by Bank Pekao in early 2021. The value of the acquired deposits amounted to approximately PLN 14.6 billion. Subsequently, in July 2022, bankruptcy was declared for the residual Idea Bank entity, which retained shares and subordinated bonds that were subsequently written down (bail-in). After 2018, Getin Noble Bank entered a persistent capital crisis that resulted in the initiation of compulsory restructuring (on September 30, 2022), the transfer of the healthy portion of its assets – including deposits worth PLN 39.5 billion – to a bridge bank (VeloBank), and the eventual bankruptcy of the residual entity in July 2023. The Getin Noble Bank case represented the largest resolution process in the history of Polish banking.

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⁸ Statement by the Bank Guarantee Fund and the Office of the Polish Financial Supervision Authority regarding the compulsory restructuring of Getin Noble Bank. More details in the LEX Legal Information System: https://sip.lex.pl/orzeczenia-i-pisma-urzedowe/pisma-urzedowe/oswiadczenie-bankowego-funduszu-gwarancyjne-go-oraz-urzedu-185249007?utm_source=copilot.com [accessed: 4.09.2026].

⁹ On a side note, it is worth mentioning the low level of public awareness of bankruptcy and restructuring processes. The publicity surrounding a fragment of L. Czarnecki's recording, which discusses Zdzisław Sokal's (then President of the Bank Guarantee Fund and President Duda's representative at the Polish Financial Supervision Authority) alleged plan to take over a bank in trouble for ...for one zloty and its recapitalization with PLN 2 billion. Without taking into account the bank's net value (factoring in its losses and liabilities), the PLN 1 figure is fundamentally misleading to the average bank customer.

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Interpreting the bank runs experienced by these institutions solely in terms of moral panic is an oversimplification; one must also take into account their deteriorating financial standing and the deposit guarantee system. The specific nature of the Bank Guarantee Fund (BFG) guarantee scheme necessitated a segmentation of the bank's client base – specifically distinguishing those with claims exceeding the €100,000 guarantee limit, as well as holders of bonds or other financial instruments not covered by the guarantee. A separate segment consisted of so-called “Swiss franc borrowers” (*frankowicze*), who were anticipating favorable dispute resolutions based on the classification of certain clauses in their residential mortgage contracts as abusive. Amidst the situation facing Getin Noble Bank, customer sentiment was heavily influenced by numerous media reports portraying the bank in a negative light. Under these circumstances, the bank's public relations efforts failed to significantly improve its image or restore public trust, although it did ultimately manage to stabilize the outflow of funds (Stockwatch.pl, 2022). However, consistent with the concept of moral panic, the customers' focus on the risk of bankruptcy exerted pressure not only on the banks themselves but also on financial safety-net institutions. This was particularly significant given that a potential bank failure – requiring the payout of guaranteed funds (approximately PLN 54.1 billion) alongside the settlement of other claims – would have been unprecedented in the Polish banking system. Despite controversies regarding the appropriateness of the measures adopted in the Regulation of the Minister of Development and Finance of May 25, 2017, concerning higher risk weights for real estate mortgage exposures, it can be assumed that these measures were motivated, at least in part, by the risk of social unrest.

A deeper analysis of the moral panic surrounding Swiss franc-indexed loans – viewed from a perspective broader than the purely sociological – would require a nuanced segmentation of borrowers: distinguishing between those who engaged in a form of “safe gambling” (moral hazard) when taking out their loans, and those whom banks – during the creditworthiness assessment process – steered toward foreign currency or currency-denominated loans instead of PLN-denominated ones. This primarily concerns CHF-denominated loans, which were attractive due to the favorable PLN/CHF exchange rate and interest rates. Awareness of currency risk is also a crucial factor.

However, when applying the concept of “bank panic” – interpreted here as the spread of contagious emotions – one must also consider the interests of lawyers at law firms (who stood to gain from representing borrowers) and politicians who ostensibly championed foreign currency loans as being more beneficial for clients (despite opposition from the Polish Financial Supervision Authority – KNF – and warnings from the Polish Bank Association). Regulators

also responded by issuing the KNB's 2006 Recommendation S, which tightened the rules for granting foreign-currency loans and was intended to serve both preventive and stabilizing purposes (KNB 2006), and the EBA's stress tests confirmed the resilience of Polish banks to the risk associated with Swiss franc loans (EBA 2023).

DISPUTES BETWEEN BORROWERS AND BANKS REGARDING CHF – DENOMINATED MORTGAGE AGREEMENTS

The escalating conflict between banks and borrowers holding so-called “Swiss franc loans” can be viewed through the lens of a moral panic. At the heart of the dispute lay legal risks associated with specific contract clauses – clauses that a significant segment of the legal community deemed abusive, a stance not devoid of self-interest regarding their own professional gain. The likelihood that this risk would materialize compelled banks to set aside substantial financial reserves.

In Poland, the crisis surrounding Swiss franc (CHF) mortgages evolved from a localized banking sector issue into a nationwide social drama dominated by narratives of “victims” and “perpetrators.” Applying Stanley Cohen’s model to analyze the issue’s maturation and the resulting risk of banking system destabilization requires considering several factors: the organization of groups opposing loan contract terms (often bolstered by lawyers who saw profit in litigating these disputes or even purchasing the loans themselves); media coverage that generally favored the borrowers’ position; and political statements and personal accounts. Examining these elements reveals the deeper social mechanisms that led to a redefinition of the relationships between citizens, the state, and financial institutions. CHF-denominated mortgage loans were granted in Poland on a massive scale between 2005 and 2008, with a total value of approximately PLN 116 billion at the time of origination (BIK, citing KNF data). Since 2012, such loans have no longer been widely issued, and the portfolio value has been steadily declining; by the end of 2018, bank balance sheets held 457.3 thousand CHF loans with a total value of PLN 104.8 billion (KNF, 2019). This decrease is attributable to repayments, settlements, currency conversions, and court-ordered contract invalidations.

KNF reports on currency risk and mortgage loan portfolios indicate that, at the end of 2018, the portfolio value stood at approximately PLN 104.8 billion, comprising 457.3 thousand active contracts. By the end of 2025, however, the Swiss franc loan portfolio in Poland had shrunk to just approximately PLN 8.2 billion, with around 115–150 thousand active or disputed contracts remaining in the sector. The sharp decline in the value and number of Swiss franc-denominated loans was driven by mass settlements (e.g., mBank settled 40% of its portfolio),¹⁰ final court rulings invalidating contracts, repayments, and currency conversions, all occurring against the backdrop of virtually no new sales of foreign currency loans since 2011.

¹⁰ mBank won 3 out of 1,081 “Swiss franc loan” cases in six months. Full data in the report: Swiss franc borrowers, euro loans, settlements, and repaid loans. Sosnowski, Attorneys-at-Law and Legal Advisors. <https://www.sprawcy-przeciwko-bankom.pl/> [accessed:4.09.2026].

Table 1. Mapping the “Swiss franc borrowers” crisis onto the theoretical framework of moral panic

Elements of moral panic	Manifestations in the „Swiss franc borrowers” case
Underlying social anxiety	Existential risk, economic uncertainty, the cultural value of homeownership, distrust of banks, the power imbalance between professional institutions and the ordinary customer
Scapegoat	The banking sector portrayed as „banksters”; banks viewed as greedy and amoral institutions
Moral entrepreneurs	Activists (Tomasz Sadlik, the Dziubak couple) and organizations (Association of Those Harmed by the Banking and Legal System, Stop Banking Lawlessness Association)
Media amplification	Highlighting the customers’ status as victims and predicting dire scenarios for the banking sector
Political reaction	Promises of legislative intervention – subsequently withdrawn, yet the mere threat impacts the market
Symbolism and metaphors	Abusive clauses as a symbol of greed
Social reaction	Local and nationwide protests, mass litigation, and rulings by common courts, the Supreme Court, and the CJEU

Source: Own elaboration.

Analyzing the Swiss franc borrowers’ protest through the lens of moral panic theory reveals how the issue of legal risk transformed into a moral crusade threatening the stability of the Polish banking sector. However, this case introduces new elements to classical theory: a large financial institution became the “folk devil” (a figure of collective threat symbolically held responsible for violating social values; Cohen, 1972, p. 9), and the panic was instrumentally exploited by politicians. Yet the most significant takeaway is the role played by a segment of the judiciary which, by siding with consumers on formal grounds, validated the social movement’s moral claims – paradoxically contributing, within the economic paradigm, to a situation where the time value of money effectively became zero percent (in cases where loan agreements were declared void). The number of lawsuits concerning Swiss franc-indexed loans surged after 2019, reaching over 90,000 new cases in 2023. In 2024, approximately 82,700 new lawsuits were filed, while at the beginning of 2025, around 166,000 such cases remained pending (Ministry of Justice, 2025).

The experience of the Swiss franc loan crisis in Poland not only led to a significant erosion of the perception of banks as institutions of public trust among a large segment of society but also unprecedentedly strengthened the consumer’s position in the financial market. This is, after all, not unrelated to the European Union’s pro-consumer legislation. From a sociological perspective, one might venture to suggest that the so-called “franc panic” will come to be seen as a story of civic awakening and the triumph of the rule of law over the power of capital.

SUMMARY

The structure of moral panic offers a useful analytical framework for explaining – or at least interpreting – how exaggerated accounts and concerns regarding social problems and deviance permeate public opinion and the political sphere (Cohen, 2002; Garland, 2008). A typical model follows a sequence comprising a specific event or phenomenon, the interests of a social or professional group, media pressure surrounding the event, vocal criticism from the political opposition, a response from policymakers, and the enactment of – often hastily drafted – legislation (Cohen, 2002; Goode and Ben-Yehuda, 2009). Under specific circumstances, moral panic can pose a threat to the stability of the financial sector in the short to medium term; however, its ephemeral nature limits its long-term impact and may even neutralize its destabilizing potential.

The analysis presented in this article illustrates the impact of moral panic – amplified by the actions of other actors, particularly the high-profile, mass reaction of traditional and social media to the localized destabilization of banks or even the risk of systemic banking sector instability. Empirically validating this thesis would require in-depth research, including the collection of longitudinal data and the estimation of the strength of relationships or the timing of the phenomenon's occurrence, its public disclosure, and its dissemination across media channels (especially social media), while also incorporating detailed information reflecting changes in the financial standing of individual banks. An analysis of the Swiss franc loan crisis through the lens of moral panic reveals that a sudden surge of emotion and anxiety can have far-reaching consequences for the financial sector. A key factor is the way “moral entrepreneurs” and their allies – individuals or groups actively defining public issues – construct a narrative of threat by exaggerating risks and oversimplifying their causes.¹¹ Consequently, the public (or a segment thereof) demands swift action from decision-makers, regulators, and legislators – demands that often result in ad hoc solutions lacking full consideration or rationality.

The case of Swiss franc loans in Poland demonstrates that credibility can be rapidly shaken or lost, even in an environment of relatively high trust in banking institutions.¹² Panic – fueled by moral entrepreneurs and other activists spreading rumors of bank insolvency, dire warnings about a currency collapse, sharp interest rate hikes, or account freezes due to cyberattacks or major system failures – effectively stokes emotions; when these narratives are amplified in the media through a snowball or avalanche effect, they threaten the stability of the entire system (cf. Dec and Masiukiewicz, 2015). This type of crisis is normative in nature: it stems from a perceived violation of principles of fairness and the conviction that consumers have fallen victim to the system – a situation that can lead both to legitimate demands for protection and to actions detrimental to both customers and institutions (Życie Bez Kredytu, 2021). In response to such panic, policymakers and key market or system actors should employ not only

¹¹ Cf. the mechanism described in Polish studies on moral panics regarding the family (Sokotowska, 2015).

¹² According to a CBOS study (2012), in 2012, 62% of Poles believed that the money entrusted to banks was safe.

regulatory instruments or concrete decisions but also credible information and educational initiatives, ideally involving recognized authorities. The aim is to achieve both an immediate effect – containing the panic – and a long-term impact on competence, fostering greater stakeholder awareness.¹³ Such initiatives are particularly valuable today, given the prevalence of “fake news” and the way online platform algorithms make such information appear highly plausible by tailoring content to individual characteristics.

The case of Swiss franc mortgage holders also exposes the limitations of domestic theoretical discourse regarding moral panic. Consequently, further analysis is required – covering a broad spectrum of phenomena, from financial crises to ideological or even worldview-based disputes – to identify the common features of the mechanisms that generate panic and to catalog their specific characteristics. In an era defined by the growing influence of fintech and social media, where information spreads rapidly, there is a risk of new forms of moral panic emerging – for instance, concerning cryptocurrencies or lending platforms; they require heightened vigilance and cooperation between researchers and financial market practitioners, as well as an appropriate response from regulators and legislators. For moral panic is not merely an irrational reaction of the crowd but also a signal of genuine fears and frustrations which – if understood and incorporated into public policy – can contribute to the development of a fairer and more stable financial system (Sokołowska, 2015).

The issue of moral or safe gambling – concepts closely linked to moral panic – has received only marginal attention in these deliberations. However, unlike moral panic, which falls within the domains of sociology, political science, or criminology, moral hazard is intrinsically tied to economics and finance. Effectively managing moral panic and moral hazard requires the methodological and procedural integration of research into these categories, as well as their interdisciplinary consolidation.

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¹³ KNF announcements after Russia's invasion in 2022 helped limit the risk of a deposit panic (KNF, 2022). The National Bank of Poland, after Russia's invasion of Ukraine on February 24, 2022, carried out currency market interventions, curbing the sharp depreciation of the zloty (NBP, 2022a). Statements from the NBP president had a calming effect on the market and public opinion, reducing the risk of both currency and deposit panic (Borowski and Jaworski, 2024, pp. 33–45). This confirms the thesis about the systemic role of communication by financial safety network links, especially the central bank, in stabilizing the situation even in the case of crisis triggers with a transnational character (NBP, 2022b).

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Assessment of key risks to economic policy, financial system stability and the credibility of the zloty Results of the 17th edition of the European Financial Congress Forecast Consensus

INTRODUCTION

The European Financial Congress (EKF) Forecast Consensus is updated every six months. It serves as a compendium of knowledge on the most significant challenges and risks facing the Polish economy. Thanks to the opinions of several dozen experts and nationally renowned macroeconomists, as well as the consensus-building procedure¹ that has been in use for years, we obtain a scenario of events over a three-year horizon, which enables decision-makers, investors and financial institutions to familiarise themselves with the projections and respond appropriately to the identified changes.

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¹ The methodology for reaching consensus was described in earlier editions of "Safe Bank".

In the opinion of EKF experts, the macroeconomic challenges facing Poland will, in the coming years, be increasingly determined by geopolitical tensions and the growing importance of military and cyber security.

It will be crucial to maintain sustainable economic growth and strengthen institutional and regulatory credibility. Of particular importance is the predictability of economic policy, improving the quality of public institutions and restoring the state's fiscal credibility, mainly by limiting the risk of a sustained increase in the deficit and debt of the general government sector.

Despite mounting structural and geopolitical risks, Poland remains an economy with relatively high growth potential compared with the rest of the European Union.

To maintain the security and competitiveness of the Polish economy, the following will be of paramount importance in the coming years:

- increasing defence spending,
- stimulating investment and innovation, including better utilisation of domestic savings,
- the energy transition,
- the consolidation of public finances, and in particular curbing the rise in the budget deficit.

In this report, we focus on measures aimed at sustainable economic development and financial stability. We also identify the most significant risks to the Polish economy, the stability of the financial system and the credibility of the PLN, together with the likelihood of their occurrence. Finally, we present our recommended actions.

In the first stage, each expert identified the three risks they considered most significant in each of the identified areas. Based on these submissions, a list of the most frequently cited risks was compiled. In the second stage, each participant in the study was asked to assess the severity of these most frequently identified risks (the severity scores must total 100 points) and the likelihood of their occurrence (on a scale from 0 to 100 per cent).

A graphical illustration of the synthesis of expert opinions is provided by the risk maps (see Figures 1–3).

1. FORECASTS FOR ECONOMIC GROWTH AND ITS COMPONENTS

The average macroeconomic forecasts by EKF experts predict a steady decline in the rate of growth of Polish GDP. Last year's forecast predicted a fall of approximately 3.60 per cent year-on-year; this year's forecast stands at 3.5 per cent year-on-year, 3.0 per cent year-on-year in 2027, and 2.9 per cent and 2.6 per cent in the following two years. This means that the country's most comprehensive forecasting panel (this year's edition featured 17 participants, including the analytical teams of all the largest commercial banks in Poland, experts from independent research centres and representatives of the public sector) predicts that the period of relatively strong growth is giving way to a phase of a systematic slowdown in its pace.

Table 1. 2025 results and forecasts for GDP growth, domestic demand, private consumption and gross fixed capital formation for 2026–2029

Growth rate	Year	Statistical measure	Consensus forecast for the years				Number of experts
	2025		2026	2027	2028	2029	
GDP (year-on-year; %)	3.60	Average	3.53	2.99	2.85	2.63	17
		Standard deviation	0.17	0.25	0.19	0.44	
Domestic demand (year-on-year; %)	4.00	Average	3.97	3.28	2.77	2.53	17
		Standard deviation	0.61	0.46	0.45	0.82	
Individual consumption (year-on-year; %)	3.70	Average	3.26	2.96	2.84	2.58	17
		Standard deviation	0.28	0.39	0.27	0.38	
Gross expenditure on fixed assets (year-on-year; %)	4.20	Average	8.21	4.74	3.41	3.28	17
		Standard deviation	1.22	2.08	1.11	0.97	

Source: Central Statistical Office, <https://bdm.stat.gov.pl/>, European Financial Congress, 2–26.

The slower pace of GDP growth will be driven by a slowdown in the growth rate of its two main components in real terms: private consumption and investment. Private consumption growth is forecast at 3.3% year-on-year in 2026, and in subsequent years it will gradually fall further below 3%. Meanwhile, the growth rate of gross fixed capital formation, after reaching 8.2% this year, will slow to 4.7% in 2027 and, in the following two years, will move progressively closer to 3% year-on-year.

One of the key reasons for the slowdown in consumption will be the shrinking labour market. Experts forecast a decline in the number of people in employment in the national economy in each subsequent year. From the employees' perspective, this means a consistently low unemployment rate (3.2% in each of the years 2026–2029), and pressure for wage increases – despite slowing economic growth. Our experts forecast stable (albeit slightly slowing in subsequent years) wage growth in the economy of 5–6 per cent year-on-year in nominal terms. From the perspective of businesses, this will mean narrowing profit margins due to 'pressure for wage increases' in the context of a slowing economic growth rate.

Table 2. Forecast of indicators: Unemployment rate, Wages in the national economy, Number of people in employment in the national economy for the years 2026–2029

Growth rate	Year 2025	Statistical measure	Consensus forecast for the years				Number of experts
			2026	2027	2028	2029	
Unemployment rate (BAEL; year-end figures; %)	3.20	Average	3.19	3.16	3.16	3.17	13
		Standard deviation	0.12	0.18	0.27	0.36	
Wages in the national economy (year-on-year; %, nominal)	8.50	Average	6.13	5.75	5.39	5.16	16
		Standard deviation	0.68	0.54	0.48	0.46	
Employed in the national economy (end-of-period figures; y/y; %)	-0.10	Average	-0.09	-0.11	-0.06	-0.15	14
		Standard standard	0.22	0.19	0.18	0.18	

Source: Central Statistical Office, <https://bdm.stat.gov.pl/>, European Financial Congress, 2–26.

The consensus among macroeconomists on the ECF panel assumes that inflation (CPI) will return to the MPC's inflation target (2.5%) in 2028–2029, following an average annual rate of 3.3% y/y in 2026. This is consistent with the forecast for the NBP reference rate: respondents expect it to remain unchanged over the forecast horizon, although for 2028 and 2029 they anticipate a slightly higher probability of a possible rate cut.

Respondents expect the 3-month WIBOR to remain stable, which is consistent with the forecast for yields on 5-year Polish government bonds. Essentially, following a slight increase in 2026 (4.81% on an annual average), the average forecast for the following three years assumes stable yields in the range of 4.50–4.60%.

Table 3. Forecast indicators: Inflation, EUR/PLN and USD/PLN exchange rates, NBP reference rate, 3M WIBOR, 5-year bond yields, general government balance, general government debt for 2026–2029

Growth rate	Year 2025	Statistical measure	Consensus forecast for the years				Number of experts
			2026P	2027F	2028F	2029P	
Inflation (CPI; annual average; %)	3.60	Average	3.29	3.05	2.66	2.53	16
		Standard deviation	0.17	0.41	0.15	0.11	
Inflation (CPI, Dec; %)	2.40	Average	3.71	2.76	2.66	2.49	16
		Standard deviation	0.41	0.37	0.18	0.15	

Table 3. cont.

Growth rate	Year 2025	Statistical measure	Consensus forecast for the years				Number of experts
			2026P	2027F	2028F	2029P	
EUR/PLN (annual average)	4.24	Average	4.25	4.26	4.26	4.26	16
		Standard deviation	0.02	0.04	0.04	0.07	
USD/PLN (annual average)	3.76	Average	3.64	3.62	3.61	3.57	16
		Standard deviation	0.05	0.08	0.10	0.09	
NBP reference rate (end of year; %)	4.00	Average	3.76	3.65	3.54	3.64	17
		Standard deviation	0.06	0.15	0.26	0.12	
3-month WIBOR (at year-end; %)	3.99	Average	3.90	3.78	3.69	3.81	16
		Standard deviation	0.09	0.19	0.29	0.16	
5-year bond yield (at year-end; %)	4.58	Average	4.81	4.54	4.46	4.54	14
		Standard deviation	0.30	0.29	0.38	0.37	
General government balance according to EU methodology (% of GDP)	-7.30	Average	-6.88	-6.43	-5.80	-5.26	15
		Standard deviation	0.14	0.28	0.47	0.77	
General government debt according to EU methodology (% of GDP)	59.70	Average	65.74	69.52	72.60	74.53	14
		Standard deviation	1.26	1.42	2.34	3.78	
Current account balance of the balance of payments (% of GDP)	0.00	Average	-1.41	-1.36	-1.27	-1.06	15
		Standard standard	0.38	0.79	0.90	0.91	

Source: Central Statistical Office, <https://bdm.stat.gov.pl/>, European Financial Congress, 2–26.

Respondents are forecasting very high public finance deficits: 6.9 per cent of GDP in 2026, 6.4 per cent of GDP in 2027, and 5.8 per cent and 5.3 per cent in 2028 and 2029 respectively. This represents a significant deterioration compared with forecasts from a year ago (in June 2025, the average forecast was 5.6 per cent for 2026 and 4.90 per cent for 2027), so the current

deficit forecasts are 1.3 pp and 1.5 pp higher for this year and next year, respectively, than they were 12 months ago.

Higher public finance deficit forecasts for the coming years mean an even steeper rise in public debt. According to the EU method – which is, in fact, the economically correct method for calculating the deficit and debt – public debt will reach almost 66 per cent of GDP as early as this year, after last year ended just below the 60 per cent threshold. Consequently, as the ‘national definition’ of debt does not include all items, its figures are lower, which does not currently trigger the responses provided for in the Public Finance Act. However, as debt continues to rise, these measures will have to be implemented over the next 2–3 years. Respondents forecast that by the end of 2027, debt calculated using the ‘EU method’ will reach almost 70 per cent, and by the end of 2029, almost 75 per cent.

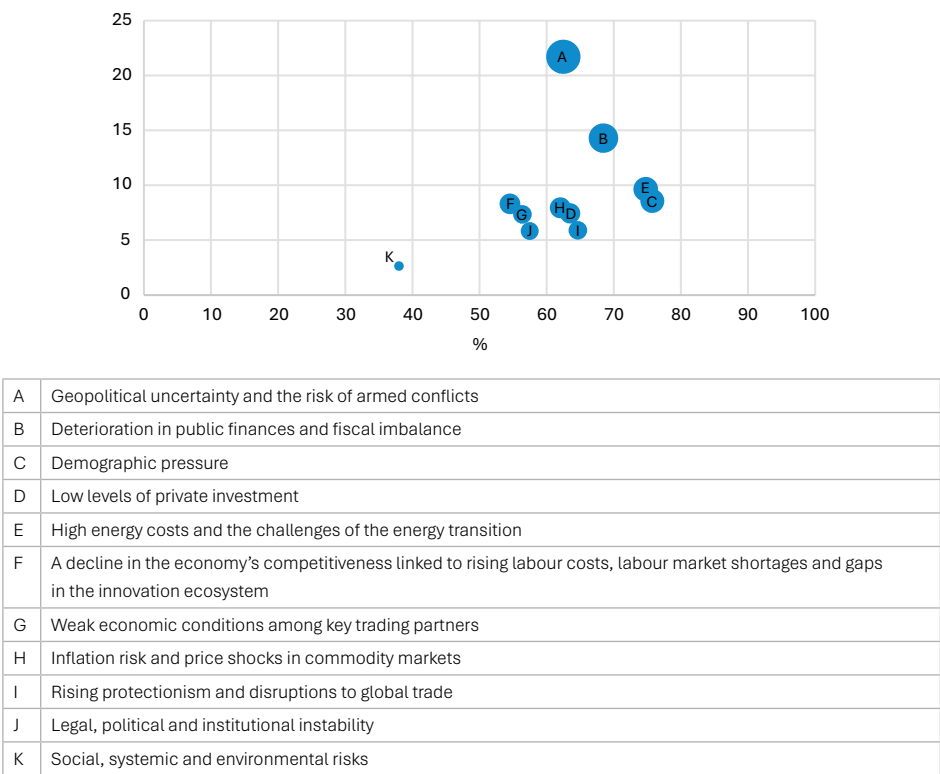
It is worth noting that the above forecasts were drawn up on the assumption of low inflation (the macroeconomists’ consensus assumes it will fall to the MPC’s inflation target within a few years), which is consistent with forecasts of unchanged MPC interest rates and stable government bond yields. However, should it transpire that inflationary pressure is higher (for example, due to worsening shortages of crude oil and gas, and their derivatives, as a result of further escalation of geopolitical tensions surrounding Iran), the above forecasts would need to be revised to account for a greater increase in debt and its servicing costs. This should be treated as a warning scenario for decision-makers responsible for the state of Poland’s public finances and the country’s macroeconomic stability.

2. KEY RISKS TO THE ECONOMIC OUTLOOK IN POLAND LOOKING AHEAD TO 2029

As in previous years, experts were asked to identify the most significant risks to the economic situation in Poland. In accordance with the methodology used, in the first stage each expert identifies the three risks they consider most significant. The responses are then grouped, and those from the most frequent groups are presented to the experts in the second stage so that they can assess their significance and likelihood of occurrence (totalling 100 points) as well as their importance on a scale from 0 to 100 per cent

In the 17th edition of the survey, the threat ‘Geopolitical uncertainty and the risk of armed conflict’ took a clear first place in terms of severity (vertical axis). – This threat was assigned an average weight of 22 points (the weights of the threats add up to 100 points), whilst its average significance was estimated at 63 per cent.

Figure 1. Significance (weight) and probability (%) of the most significant threats to the economic situation in Poland looking ahead to 2029



Source: European Financial Congress, 2026.

A Experts regard geopolitical uncertainty and the risk of armed conflict as the most significant, but at this stage they assess the probability of these occurring as ‘slightly above average’ – and are not yet reflecting this in any significant way, for example, in higher inflation forecasts. However, the situation is dynamic and it is worth monitoring developments, particularly with regard to conflicts in the Middle East and the associated geopolitical tensions, the crisis in oil and gas supply, and inflationary pressures on the global economy.

The second most significant risk, according to experts, is: “Deterioration in public finances and fiscal imbalance”, with an average weighting of 14.3 points and a 69 per cent probability of occurrence.

The third most significant risk (9.7 points) – and at the same time the second most likely to occur (75 per cent) – is “High energy costs and the challenges of the energy transition”.

In terms of the likelihood of these risks occurring, the top spot ('furthest to the right on the chart') was taken by the risk of 'Demographic pressure', with experts forecasting a steady decline in the number of people in employment in the coming years.

Third place on the list of risks to the economic outlook in the coming years, in terms of likelihood of occurrence, was taken by 'Deterioration in public finances and fiscal imbalance' – the threat already discussed above, which is assessed as the second most significant in terms of severity.

3. THE MOST SIGNIFICANT THREATS TO THE STABILITY OF THE FINANCIAL SYSTEM IN THE PERIOD – 2029

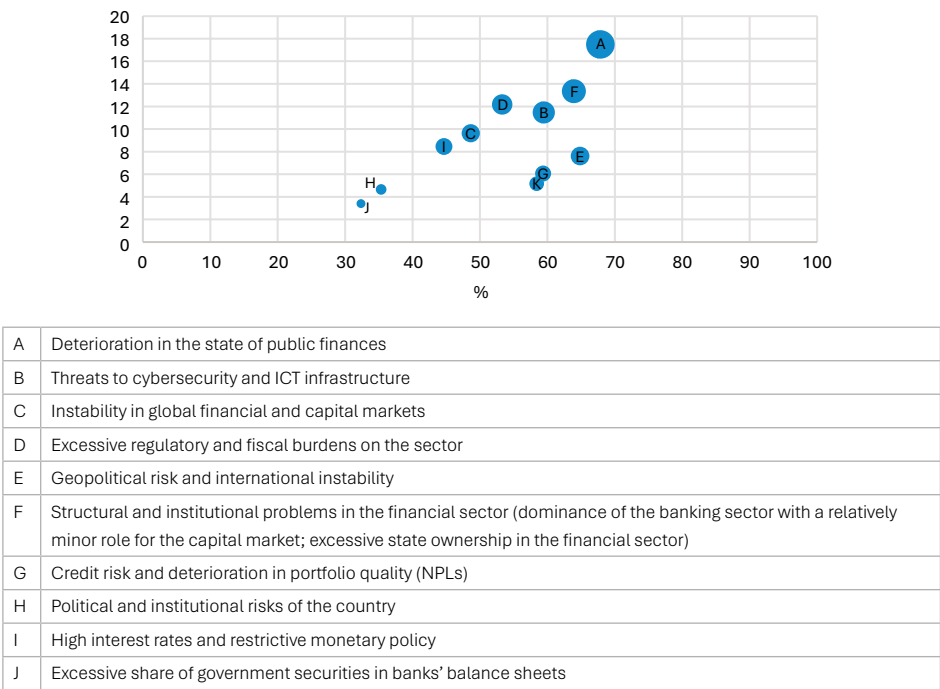
The results of the 17th edition of the macroeconomic consensus indicate that the perception of threats to the stability of the financial system centres primarily on macroeconomic, geopolitical and technological risks.

The highest-rated risk is a deterioration in public finances (weighting 17.5, probability 68 per cent). This means that the state's fiscal situation is perceived as a critical condition for maintaining the stability of the entire financial system. High levels of public debt, rising debt servicing costs and limited fiscal space may lead to an increase in risk premiums, a weakening of the state's creditworthiness and pressure on the banking sector, which holds significant portfolios of government bonds.

Geopolitical risk and international instability also remain a significant threat (weighting 13.4 points, probability 64 per cent). According to experts, international conflicts, economic sanctions or disruptions to global trade may trigger sharp capital flows, increased risk aversion and significant fluctuations in exchange rates and asset prices.

Cybersecurity threats and risks to ICT infrastructure were identified as one of the key risk areas (weighting: 11.5 points). On the one hand, the digitalisation of financial services increases the sector's efficiency and determines its competitive position in the market; on the other hand, it raises vulnerability to cyberattacks, system failures and disruptions to critical infrastructure. Attacks on payment systems, online banking or data centres could lead to a loss of customer confidence, a disruption to liquidity and even a temporary paralysis of part of the financial market. The likelihood of this threat occurring – relative to other risks – is assessed as moderate (59 per cent), but its significance will increase in the coming years as the digitalisation of the financial sector progresses.

Figure 2. Significance (weight) and probability (%) of the most significant threats to the stability of the Polish financial system by 2029



Source: European Financial Congress, 2026.

Experts rated the risk of instability in global financial and capital markets relatively highly (weighting 12.2 points; probability 53 per cent). Respondents recognise the strong dependence of the domestic financial system on the situation in international markets, as global financial crises tend to spread rapidly between economies, particularly in conditions of high financial integration.

The next most significant group of risks consists of regulatory and structural factors. Excessive regulatory and fiscal burdens on the financial sector (weight – 7.6 points; probability – 65 per cent) may limit the profitability of financial institutions and reduce their ability to finance the economy. The scope and stringency of regulations may also reduce the competitiveness of the financial sector and limit its capacity for innovation. In the Polish context, a significant structural problem relates to the dominance of the banking sector alongside a relatively underdeveloped capital market (weight – 6.1 points; probability – 60%). This structure leads to a concentration of risk within banks and limits the diversification of funding sources for businesses and households.

Credit risks also remain a significant area of concern. The legal risk associated with loan agreements, stemming from controversial case law regarding ‘interest-free loan’ penalties or challenges to the WIBOR rate, may generate significant costs for the banking sector, eroding its capital and restricting lending activity.

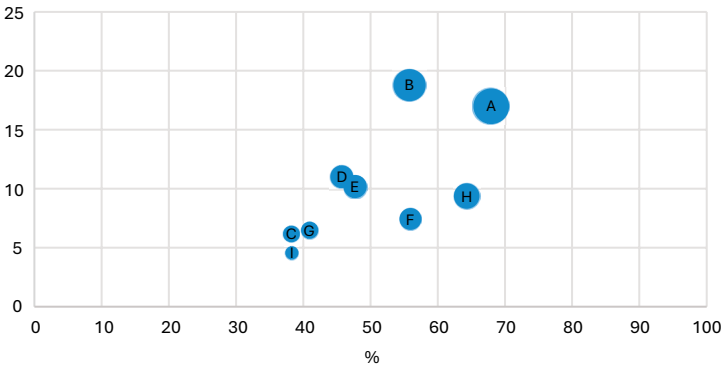
4. KEY THREATS TO THE ZLOTY’S CREDIBILITY LOOKING AHEAD TO 2029

In a manner analogous to that described in the section on risks to the economic outlook and the stability of the financial system, a list of risks to the zloty was drawn up, which were subsequently assessed in terms of their severity and likelihood of occurrence.

From the perspective of risks to the Polish currency, two threats are particularly frequently and strongly emphasised in expert opinions. These are:

- Factor A – Fiscal imbalance and the deteriorating state of public finances,
- Factor B – Geopolitical risk and threats to regional security.

Figure 3. Significance (weight) and probability (%) of occurrence of the most significant threats to the zloty looking ahead to 2029



A	Fiscal imbalance and the deteriorating state of public finances
B	Geopolitical risk and threats to regional security
C	Persistently high inflation combined with inconsistent monetary policy
D	Global risk aversion and capital outflows from emerging markets
E	A decline in Poland’s creditworthiness combined with the risk of a rating downgrade
F	Domestic political risk
G	Deterioration in macroeconomic fundamentals and the balance of payments
H	Political populism and the electoral cycle
I	Delays to Poland’s entry into the eurozone, coupled with the risk of a ‘Polexit’
J	External market and commodity shocks
K	Structural and demographic barriers

Source: European Financial Congress, 2026.

The risk associated with fiscal imbalances and rising debt is considered to have the highest probability (average probability: 68 per cent) and the second-highest risk weighting (17.0 points), whilst geopolitical risk has been assigned the highest weighting (18.8 points). We have little influence over global geopolitical risks – but public finances are entirely under national control; therefore, from the perspective of mitigating risks to the zloty – as well as to the economy and the financial sector – efforts should be directed towards reducing deficits and curbing the rate of growth in public debt.

5. KEY RECOMMENDED AREAS FOR ACTION IN POLAND'S ECONOMIC POLICY²

5.1. Consolidation and stabilisation of public finances

The need to consolidate and stabilise public finances is by far the most frequently cited issue in the opinions of EKF experts. There is almost universal consensus on this point. Poland must reduce its general government deficit to below 3 per cent of GDP in order to avoid the EU's excessive deficit procedure and stabilise debt servicing costs.

In this regard, the following steps should be taken:

- Carry out a detailed review of public expenditure in terms of its effectiveness (whether the outcomes justify the expenditure, or whether the same outcomes could be achieved with lower but more targeted expenditure), scale (prioritising the review of the largest expenditure streams) and flexibility (developing clear mechanisms for curbing expenditure in the event of serious budgetary difficulties).
- Conduct a realistic assessment of the economy's growth potential and tax revenue growth potential over the coming decade, against a backdrop of weaker potential economic growth and taking into account the risks (including the risk of higher interest rates)

The above measures would provide a basis for devising specific actions aimed at reducing budget deficits and curbing the growth of public debt whilst safeguarding pro-growth expenditure.

Another area requiring attention is the tax system, which ranks among the most complex and time-consuming for taxpayers within the OECD. Work should begin on a new tax system that is transparent and logical, so that it acts as a catalyst for economic growth rather than an obstacle to it.

5.2. Innovation, investment and economic productivity

Poland's post-transition model of economic growth was largely based on technology imports (an imitative model, dependent development). In contrast, the last decade has seen a strong trend towards integrating Polish workers into the service networks of multinational companies

² <https://www.efcongress.com/rekomendacje/rekomendacje-2026/> [accessed: 10.07.2026].

(export of services). Unfortunately, these practices aimed at stimulating development are no longer capable of driving growth with the same vigour as before. Firstly, because Poland is no longer a low-cost country in this respect (in terms of wage levels and growth). Secondly, due to the demographically determined inability to further increase employment.

In the face of these challenges, it is essential to strengthen the creation and development of enterprises that generate intellectual property and genuine innovation, and commercialise and monetise them on an international scale. There is a need to strengthen the system for building intellectual property that generates margins over subsequent years, rather than that sold on a one-off basis through one-off fees. As part of an appropriate package of measures, the following should be undertaken:

- Review and assess the effectiveness of the measures implemented to stimulate innovation (including the rules of the Polish Investment Zone, the R&D tax relief, the IP Box scheme, tax relief for innovative employees, tax relief for prototypes, for robotisation, for expansion – and others). This review of the measures and an assessment of their impact should address questions regarding their effectiveness in stimulating genuine innovation and the coherence of the entire system.
- Review the effectiveness of measures undertaken to date under the Polish Development Fund and Bank Gospodarstwa Krajowego, in terms of the outcomes of the expenditure incurred and the establishment of a system to support innovation and the scaling up of technology firms, whilst taking into account the state's economic interests (e.g. in its role as a minority shareholder, benefiting from the success of enterprises – so that the profits from such ventures flow back and strengthen the system).
- Analyse the effectiveness and efficiency of existing institutions supporting innovation and consider creating, either from within them or alongside them, an independent agency dedicated to supporting innovation, modelled on DARPA (USA) and its European counterparts.
- Reform the system for commercialising the results of scientific research in the science and higher education sectors, incorporating elements that link scientific evaluation to implementation, so that public expenditure on science translates more clearly into socio-economic development.

5.3. Demographics, the labour market and labour force participation

Over the next decade, Poland will have the fastest-ageing population in Europe, which will pose a challenge both to the economy and to the pension system, the healthcare system and social care.

In this context:

- the demographic crisis must be addressed with a coherent programme, rather than a package of transfer payments – EKF experts clearly distinguish between 'pro-family policy'

as a set of benefits and a genuine demographic programme encompassing access to care, housing conditions, flexible working arrangements and the care services market.

- the proposed measures follow three strands: pro-family policy (fertility rates), the activation of economically inactive groups (women, the over-55s) and a conscious and selective migration policy aimed at attracting skilled workers.
- The pension and healthcare systems must be reformed before demographic pressures become unmanageable – the growing debt of the Social Insurance Fund (FUS) and the National Health Fund (NFZ) is, in the view of some respondents, a ‘ticking time bomb’ – and reforms must be carried out proactively, not reactively.
- The education and vocational training systems must be modernised. Digital skills, critical thinking and the ability to engage in lifelong learning are regarded as essential for increasing labour productivity in the context of automation.

5.4. Investment attractiveness and risk, institutional and regulatory stability

Legal uncertainty in the financial sector and the annulment of loan agreements must be urgently addressed. Unresolved legal risks (Swiss franc loans, WIBOR) result in higher borrowing costs for the economy as a whole and hinder banks’ ability to finance investment; a systemic solution is a prerequisite for triggering a long-term credit boost.

Over-regulation must be curbed and the legal environment for businesses simplified – the volatility and complexity of the law are cited as one of the main factors deterring investors; there are calls for both deregulation and an improvement in the quality of law-making (regulatory impact assessments, ex ante evaluation).

The management of public institutions and state-owned enterprises must be depoliticised – political appointments in banks, funds and energy companies reduce the efficiency of capital allocation and undermine investor confidence.

Some economists view the adoption of the euro as a means of macroeconomic stabilisation and integration with EU markets, which would reduce financing costs and exchange rate risk.

5.5. Energy transition and energy security

In the area of energy transition and energy security, the following measures are recommended:

- **Establish a cross-sectoral regulatory framework for the energy transition that is sustainable and predictable**

A stable, long-term regulatory framework for the energy transition should be adopted, one that is resilient to short-term political changes and enables businesses, investors, network operators and local authorities to plan their decisions over a 10–20-year horizon. Regulatory predictability should be regarded as a prerequisite for Poland’s economic security; the price of energy is of comparable importance.

In practice, this means adopting a coherent energy strategy setting out targets for the coming decades, with sub-targets for 2030, 2040 and 2050. This includes, amongst other things, the target energy mix, principles for grid development, renewable energy sources, nuclear energy, energy storage, available energy sources and appropriate flexibility. This strategy should be consistently translated into legislation, investment decisions and administrative practice.

It is crucial to limit frequent and unpredictable changes to regulations concerning the energy market, support schemes, tariffs, network charges, connection rules, reporting obligations and energy contracting mechanisms. Any significant regulatory change should be preceded by an impact assessment on investors, energy consumers, the financial sector and the stability of the electricity system.

A principle should also be introduced to protect investors against arbitrary changes to the rules during the implementation of projects, particularly in the case of capital-intensive investments: renewable energy, energy storage, nuclear power, direct transmission lines, district heating, grids and energy efficiency projects.

- **Develop an integrated energy mix based on the complementary nature of nuclear power, renewable energy sources, energy storage and system flexibility**

Poland should develop nuclear power, renewable energy sources, energy storage and flexibility services as mutually complementary elements of a single electricity system, rather than as competing technologies. The aim should be to create a low-carbon, resilient, cost-stable system capable of meeting the economy's growing demand for electricity.

Nuclear power should serve as a stable, low-carbon source of generation, which is particularly important for security of supply, reducing dependence on fossil fuels and ensuring a predictable energy supply for energy-intensive industries. Renewable energy sources should be developed as a source of new, cost-competitive generation capacity, particularly in onshore and offshore wind power, photovoltaics, biogas and biomethane.

At the same time, the expansion of renewable energy requires the rapid development of energy storage, local balancing, aggregation, demand response and dynamic tariffs. These solutions should mitigate the effects of fluctuations in renewable energy output, reduce the risk of curtailment of renewable generation, improve security of supply and lower system balancing costs.

The development of nuclear power, renewable energy and energy storage should be planned in conjunction with grid expansion, the electrification of industry, transport and district heating, and an increase in the proportion of active consumers. A lack of such coordination may lead to cost-inefficient investments, grid congestion, refusals to connect new customers and the failure to utilise the potential of low-cost renewable energy.

- **Treat transmission and distribution networks as strategic bottlenecks to Poland's economic development**

The modernisation and expansion of electricity networks should be recognised as one of the most important priorities of the energy transition and the state's economic policy. Without effective transmission and distribution infrastructure, it will not be possible to connect new energy sources, develop renewable energy, energy storage, nuclear power, industrial self-consumption, electromobility, heat pumps or new industrial investments.

The first priority should be to increase the connection capacity of distribution networks, as these are the key factor determining the development of distributed energy, local energy storage, energy clusters, energy communities, prosumer installations and industrial generation sources. Modernisation should include automation, digitalisation, smart grid management systems, remotely read meters and mechanisms enabling consumers to participate actively in the energy market.

At the same time, it is necessary to expand transmission networks for major strategic projects, including offshore wind farms, nuclear power, large-scale energy storage facilities, dispatchable generation sources and new centres of industrial demand. Infrastructure planning should be coordinated with the siting of future generation sources and industrial investments.

The effectiveness of grid investments should be assessed not only in terms of the level of expenditure, but above all in terms of tangible outcomes: the number of new connections, an increase in available connection capacity, a reduction in connection refusals, a reduction in overloads, a reduction in grid losses, improved supply reliability and an increase in the capacity to integrate renewable energy sources.

- **Make effective use of EU funds and private capital to finance investments of the greatest systemic importance**

European Union funds, in particular from the National Recovery Plan (KPO), the Cohesion Fund and other transformational instruments, should be utilised as effectively and promptly as possible for projects that remove key barriers to the development of the electricity system. Funding should be directed primarily where it yields the greatest systemic and economic impact: towards the grid, energy storage facilities, new generation capacity, the digitalisation of infrastructure, and solutions that enhance system flexibility.

Priority should be given to investments that reduce grid congestion, connection refusals, insufficient automation, a lack of local flexibility and limited capacity to integrate renewable energy sources. It is essential to establish a transparent hierarchy of projects based on their impact on security of supply, reducing energy costs, industrial development, reducing emissions and increasing the investment attractiveness of regions.

EU funds should act as a catalyst for private and domestic capital. The scale of investment needs in the energy sector exceeds the capacity of public subsidies alone; it is therefore

essential to combine EU funding with bank financing, bond financing, operators' funds, public guarantees, contracts for difference, auctions, long-term power purchase agreements (PPAs/cPPAs) and other instruments facilitating long-term financing.

It is also necessary to ensure that the available funds are utilised to the greatest possible extent within the required timeframes. This requires the simplification of administrative and tendering procedures, the strengthening of beneficiaries' institutional capacity, ongoing monitoring of the risk of delays, and better coordination between the government, the Energy Regulatory Office (URE), PSE, distribution system operators, local authorities, the financial sector and investors.

- **Link the energy transition to industrial competitiveness, exports and attracting investment**

The energy transition should be viewed not only as a process of modernising the energy sector, but as one of the cornerstones of the competitiveness of the entire Polish economy. The price, availability, stability and carbon footprint of energy will increasingly determine the export capacity of businesses, the location of new industrial investments and Poland's position in European and global supply chains.

Energy policy should be closely linked to industrial and investment policy. Businesses need predictable conditions regarding access to energy, networks, connection capacity, support mechanisms and billing rules. Solutions that strengthen competition and reduce energy costs for end-users should be supported, in particular long-term contracts (PPAs/cPPAs), direct lines, distributed generation, flexibility services, aggregation and the active participation of industrial consumers in the energy market. Competition should promote a more efficient allocation of investment, greater price transparency and a reduction in the costs of the energy transition.

Of particular importance are energy-intensive sectors, which compete on international markets and are most vulnerable to the effects of high energy prices, regulatory instability and delays in decarbonisation. A failure to modernise the electricity system swiftly may lead to a permanent deterioration in the position of Polish industry, a decline in the country's investment attractiveness and a slowdown in economic growth.

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