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Managing bank liquidity hoarding during uncertain times: The role of board gender diversity

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Abstract

This paper examines the effect of executive board gender diversity on the relationship between economic policy uncertainty (EPU) and bank liquidity hoarding (LH). We focus on the Russian banking sector, which, relative to most of the world, has a high share of women on bank executive boards. Using the news-based EPU index developed by Baker, Bloom, and Davis (2016) and LH measures proposed by Berger, Guedhami, Kim, and Li (2022), we exploit a unique dataset from the Russian banking sector. While higher economic policy uncertainty tends to increase liquidity hoarding, we find that this effect diminishes as the gender diversity of the board increases. We attribute this finding to the moderating influence of gender diversity on stability and overreaction in decision-making. Additionally, we find that the channel through which board gender diversity affects the impact of economic policy uncertainty on liquidity hoarding takes place via the hoarding of liquid assets. Our findings are robust to the use of alternative measures for economic policy uncertainty and gender diversity and hold after addressing endogeneity concerns. As women are still significantly under-represented on bank boards in most countries, these results argue for policies to promote

gender diversity on bank boards as a means of limiting the detrimental effects of economic policy uncertainty.

KEYWORDS
bank boards, economic policy uncertainty, gender diversity, liquidity hoarding

JEL CLASSIFICATION
G18, G21, G34, P26

1 | INTRODUCTION

While the number of women in management positions has steadily increased in recent decades, the executive world remains only marginally gender diverse (Abou-El-Sood, 2021). In the banking industry, women occupied fewer than 2% of CEO positions and fewer than 20% of board seats, even with implementation of gender quotas for corporate boards in several countries (Sahay et al., 2017).

Given the behavioural differences between women and men, female under-representation in boardrooms could have economic effects. Women are less likely to be overconfident (e.g., O'Laughlin & Brubaker, 1998; Pajares & Miller, 1994) and more risk-averse than men in financial decision-making (Barber & Odean, 2001; Croson & Gneezy, 2009). The empirical banking literature drawing on these insights shows significant effects of board gender diversity on both risk-taking (Cardillo et al., 2021; Farag & Mallin, 2017; Mateos de Cabo et al., 2012) and financial performance (García-Meca et al., 2015; Owen & Temesvary, 2018; Pathan & Faff, 2013).

Our discussion here focuses on influence of board gender diversity on bank behaviour in uncertain economic times. During such times, the behaviour of the banking industry, which plays a central role in financing the economy, takes on heightened significance through the use of counter-cyclical and moderating measures.

Liquidity hoarding by banks is of particular importance during uncertain times. It can have substantial and potentially very negative impacts on the overall economy and financial system (Berger et al., 2023). Banks hoard liquidity in two ways. On the asset side, banks can increase their holdings of liquid assets such as cash and marketable securities. On the liability side, they can increase collection of liquid deposits or other liquid liabilities. Berger et al. (2022) assert that economic policy uncertainty (EPU) harms the economy by enhancing bank liquidity hoarding. Liquidity hoarding implies a drop in bank lending on the asset side and a tendency to favour highly liquid forms of financing on the liability side. They show that this behaviour is not driven by bank customer supply and demand, but rather deliberate policy decisions at the bank level, and conclude that EPU can be detrimental to the economy through its effect on bank liquidity hoarding.

This paper aims to explore the impact of executive board characteristics on the relation between EPU and liquidity hoarding. Building on prior research that demonstrates the influence of executives' behavioural biases on liquidity hoarding (Berger et al., 2023), our primary objective is to investigate whether greater board gender diversity is likely to foster or diminish the adverse EPU effects through its impact on bank liquidity hoarding.

The first of our two competing arguments on the influence of board gender diversity says that *a diverse board facing EPU is likely to increase liquidity hoarding*. As greater board diversity generally implies a higher presence of women on bank boards, greater female representation should increase liquidity hoarding in response to higher EPU as women tend to be more risk-averse. In other words, in presence of higher uncertainty, women on bank boards favour the increase of liquid assets and liquid deposits in order to reduce threats associated with liquidity shocks. Uncertain times could even amplify the risk aversion of women if women board members place greater weight on the downside consequences of poor decisions in the face of financial hazards (Olsen & Cox, 2001). Indeed, the majority of works on

the relation between the presence of women on bank boards and bank risk-taking corroborate this view (e.g., Cardillo et al., 2021; Dong et al., 2017; Farag & Mallin, 2017; Lu & Boateng, 2018; Mateos de Cabo et al., 2012).

Our competing argument states that *board diversity tends to constrain liquidity hoarding urges during EPU episodes*. Two mechanisms could deliver this result. First, the literature suggests that greater board gender diversity enhances bank financial performance (García-Meca et al., 2015; Owen & Temesvary, 2018). The reasons for better performance may stem from the broader spectrum of views and skills that accompany greater board diversity. For example, diverse management teams may consider a broader range of alternatives, be more open to new ideas (Arnaboldi et al., 2021; Bantel & Jackson, 1989), and possess greater cognitive variety that enhances performance (Adams & Ferreira, 2009). Thus, we expect that banks with higher board gender diversity tend to outperform other banks during uncertain times. They are less likely to overreact and to overweight the shares of liquid assets and liquid deposits in the balance sheet when EPU is higher, which results in greater bank performance.

Second, previous research has shown that greater board gender diversity is associated with higher accountability and transparency, and lower probability of bank misconduct (Arnaboldi et al., 2021; Baselga-Pascual et al., 2018). Banks with more gender-diverse boards are less focused on hoarding liquidity in troubled times. As seen in the Global Financial Crisis of 2008–2009, banks with low transparency and accountability were largely concerned with liquidity shocks and funding difficulties. Thus, banks with more gender-diverse boards should be less affected by the impact of EPU on liquidity hoarding.

We test which of our two competing views empirically dominates on a sample of large Russian commercial banks during the period running from 2004 to 2018. The Russian dataset is particularly well suited to our research question for three reasons.

First, women are strongly represented on the executive boards of Russian banks. During our observation period, about 30% of executive board members are women. In contrast, only 7% of board seats of European banks (Mateos de Cabo et al., 2012) and 12.5% of board seats of US banks (Owen & Temesvary, 2018) were held by women in the same period. We can thus perform a thorough comparison among bank boards, which is not affected by the specific features of a handful of female board members.

Second, the sample is large and homogenous. It includes large government-controlled banks, foreign banks, and domestic private banks, that is, not restricted to a single type of ownership status. We consider 149 banks, all performing commercial banking activities, within the same regulatory and supervisory environment, for the period 2004–2018. Such a long period of observation allows us not to restrict our findings to one specific year.

Third, Russia provides an ideal natural laboratory. The country is well suited to the study of EPU effects due to high volatility in policy uncertainty caused by geopolitical and other economic shocks.

Our main dependent variable is bank liquidity hoarding, which is a comprehensive measure of bank activities developed by Berger et al. (2022). It considers all balance sheet activities and weighs bank assets and liabilities according to their contribution to liquidity hoarding. We measure policy-related economic uncertainty with the Russian EPU index developed by Baker et al. (2016). It is a news-based measure of scaled frequency counts of newspaper articles containing economic- and policy-related terms in line with the recent works on EPU (Berger et al., 2022; Gulen & Ion, 2016). We perform regressions of liquidity hoarding on a set of variables including EPU and board gender diversity at the bank level.

Our paper contributes to two strands of the literature. First, we augment the vast literature on the effects of increased board gender diversity, including the influence on performance (Adams & Ferreira, 2009; Adams et al., 2011), corporate social responsibility (McGuiness et al., 2017), operational risks (Luo et al., 2018), and reactivity to implement changes (Adams & Funk, 2012). Few works have been specifically devoted to bank boards and have mostly investigated the impact of board gender diversity on risk-taking (e.g., Lu & Boateng, 2018) and financial performance (e.g., Farag & Mallin, 2017; García-Meca et al., 2015; Pathan & Faff, 2013). We extend this strand of research with the first study examining how board gender diversity can shape the liquidity hoarding behaviour of banks in reaction to changes in EPU.

Second, we contribute to the emerging discussion on bank liquidity hoarding. Berger et al. (2023) investigate how managerial sentiment embedded in annual reports language influences liquidity hoarding, while Berger et al. (2022) concentrate on the impact of EPU. Both works employ US data. We extend this literature by including the role of board gender diversity and considering a different country.

The remainder of the paper is organized as follows. Section 2 describes the related literature. In Section 3, we describe the data and the methodology. Section 4 presents the results. Section 5 concludes.

2 | RELATED LITERATURE

In this section, we provide a brief overview of studies relevant to our research question. We first present the main results of the literature devoted to board gender diversity and firm behaviour, then develop the key findings of the studies that examine the relation between board gender diversity and bank behaviour.

2.1 | Board gender diversity and firm behaviour

Literature provides evidence that board diversity influences firm performance, with overall some beneficial effects. This influence is linked to the various effects that the presence of women on boards of directors exerts on the firm behaviour.

Women on boards of directors are associated with improved monitoring function as information circulates more efficiently between the board and investors (Adams & Ferreira, 2009; Hillman et al., 2007). Female directors are found to be more stakeholder-oriented (Adams et al., 2011; Liu et al., 2014; Matsa & Miller, 2013) and less likely to pursue personal goals through mergers and acquisitions (Levi et al., 2014). Women on boards bring enhanced corporate social responsibility (McGuinness et al., 2017), tend to act more ethically (Valentine & Rittenburg, 2007), and may reduce the risk of securities litigation (Joo et al., 2021). More gender-diverse boards are also much less likely to misreport in their accounting (Garcia-Lara et al., 2017). As a result, firms with women in executive bodies experience lower operational risks than companies led by men executives (Luo et al., 2018).

Some potential benefits of having a more gender-diverse board can also be explained by the broad spectrum of views and skills that women bring to the board. Gender-diverse management teams tend to be more innovative, more open to new ideas, show greater willingness to consider a broad range of alternatives (Arnaboldi et al., 2021; Bantel & Jackson, 1989), and are quicker to implement changes (Adams & Funk, 2012).

2.2 | Board gender diversity and bank behaviour

The impact of board gender diversity on bank behaviour is influenced by gender differences regarding risk-taking. Literature in behavioural finance shows that women are more risk-averse than men in making financial decisions (e.g., Barber & Odean, 2001; Brooks et al., 2019; Hibbert et al., 2018). In addition, the greater risk aversion of women is more pronounced in the face of financial hazards in the sense that women board members tend to place greater weight on the downside of decisions (Olsen & Cox, 2001). As these gender-based differences in individuals' risk preferences affect decision-making in a professional setting, banks with more gender-diverse boards should have more cautious business strategies and greater aversion to risk.

Empirical evidence on the relationship between board gender diversity and bank risk-taking overall supports this view. It tends to find that a greater presence of women on the board of directors is associated with lower bank risk-taking (see e.g., Cardillo et al., 2021; Dong et al., 2017; Farag & Mallin, 2017; Lu & Boateng, 2018; Mateos de Cabo et al., 2012).

However, a few works come to an opposite conclusion. Berger et al. (2014) find a positive association between the proportion of women on board and the portfolio risk for a sample of German banks. Nonetheless, the very low female participation in executive boards in their sample (around 3%) can drive these unusual findings, as noted by the authors. In a study on Latin American banks, Baselga-Pascual and Vähämaa (2021) find that banks with a higher proportion of female board members tend to be riskier. Abou-El-Sood (2021) concludes that banks invest in more risky assets when female board members are reward-incentivized for a sample of US banks. Nonetheless, female directors reduce investments in risky positions, especially at the time of financial crisis when they are aware of the penalties they might face.

A handful of works have investigated the relation between board gender diversity and bank performance. Owen and Temesvary (2018) argue that there is a U-shaped relationship between board gender diversity and bank performance. They show that female participation has a positive effect once a critical mass (gender diversity level between 20% and 40%) is achieved for a sample of US banks. Fan et al. (2019) examine how women on boards influence bank earnings management. They find an inverted U-shaped relation between women on boards and bank earnings management: when the number of women directors reaches a critical mass of three or more, earnings management declines, confirming the presence of a stronger monitoring with women on boards. Next to these two works concluding to a non-linear relation, the paper of Baselga-Pascual and Vähämaa (2021) on Latin American banks concludes that a greater proportion of female board members is positively associated with higher profitability.

Finally, some works have studied whether gender diversity in bank boards affects the transparency, accountability, and ethical reputation of banks. Arnaboldi et al. (2021) question whether gender diversity in bank boards plays a role in preventing misconduct episodes. Analysing fines received by European banks from US regulators, they find that greater female representation significantly reduces the frequency of misconduct fines. Baselga-Pascual et al. (2018) find that higher levels of risk aversion and ethicality of female directors explain lower number of misconduct cases in the presence of greater gender diversity on a cross-country sample of banks.

3 | DATA AND METHODOLOGY

3.1 | Sample description

Our data sample consists of large commercial banks from the Russian banking sector. The banking system in Russia includes a large, but shrinking, number of banks. Out of approximately 1300 active banks in 2004, only 440 were still operating in 2018. The Russian banking system is dominated by several large state-owned banks, but also includes a large number of domestic private banks and foreign banks. According to the Central Bank of Russia, the top ten banks, the largest of which are state-owned, controlled over 60% of the market at the end of 2018. Nevertheless, the remaining banks still operate in a competitive environment and most pursue similar business strategies (Davydov, 2018). Banks are the main source of debt capital in Russia, while the primary funding source for banks in Russia is customer deposits.

Given the large number of bank foreclosures and mergers in Russia, we construct the dataset around banks that have been ranked at least once during our sample period among the top hundred banks based on total assets. As there is no publicly available database of Russian bank executives, we manually extract bank-level governance characteristics from quarterly and annual reports of banks meeting our sample criterion. As these reports contain detailed information on the people involved in bank governance, we collect information on age, gender, nationality, and experience of each member of the executive board, including CEOs. In cases where reports lack complete board member descriptions, we attempt to augment missing information from publicly available web sources. We exclude those banks where governance or financial disclosures are incomplete and required information is otherwise unavailable. Our governance measures are annual, so we also check for changes in executive boards during a given year to ensure that we have complete records on individuals occupying their board position longest during that year. The final sample consists

TABLE 1 Executive board characteristics and bank liquidity hoarding measures.

Panel A. Evolution of executive board composition								
	2004	2006	2008	2010	2012	2014	2016	2018
Board size	7.13	7.08	7.29	6.87	6.72	6.79	6.47	6.39
Board age	42.32	42.46	43.28	44.32	44.87	45.57	46.43	47.48
Board gender *(% female)*	31.43	30.27	30.48	32.78	31.53	31.45	28.72	29.94
Blau index	0.34	0.33	0.33	0.35	0.34	0.34	0.33	0.34
Board tenure	3.31	3.84	4.33	4.88	5.06	5.71	5.43	5.72
CEO gender*(% female)*	10.28	8.49	11.29	9.52	11.38	12.50	15.31	16.22
CEO nationality*(% foreign)*	3.74	5.66	4.03	4.76	4.07	5.36	4.08	5.41
CEO age	43.89	43.78	44.62	44.82	45.74	46.15	47.41	49.24
CEO tenure	4.01	4.26	4.90	4.63	4.52	5.20	4.13	5.39

Panel B. Classification of balance sheet items based on liquidity		
Liquid assets *(+1/2 weight)*	**Illiquid assets *(-1/2 weight)***	**Liquid liabilities *(+1/2 weight)***
Cash and cash equivalents	Corporate loans and lease financing	Demand deposits
Correspondent accounts with other banks	Other assets	Settlement accounts of non-financial sector
Investments in all securities		Accounts of other banks

Panel A of this table provides the evolution of all characteristics of executive board composition of Russian banks. Panel B outlines classification of balance sheet items based on liquidity.

of an unbalanced panel of 1482 bank-year observations for 149 banks from 2004 to 2018. The sample banks account for over 90% of the banking sector's total assets.

Since our dataset is the first comprehensive collection of governance characteristics of Russian banks, we present the evolution of an average executive board in Panel A of Table 1. During our 15-year observation period, the average executive board size decreases from around seven to six members, the age of the average board member rises and they tend to enjoy significantly longer tenures. Women occupied almost a third of board seats in 2010, but this number declines slightly in later years. Nevertheless, these figures indicate that women are better represented on bank executive boards in Russia than in most countries. For example, in Germany, women take only about 3% of executive board seats (see e.g., Berger et al., 2014), implying a tenfold difference with Russian banks. Such a distinct characteristic of the Russian banking market enables powerful empirical tests of the relationship between gender diversity in executive boards and bank liquidity hoarding.

During our sample period, the number of banks with women CEOs increased from about 10% to over 16%, a level relatively high compared to most banking markets. Bank chief executives also tend to get older and have longer tenures later in the sample period.

3.2 | Liquidity hoarding and economic policy uncertainty measures

Our main dependent variable is *bank liquidity hoarding*, a comprehensive measure of bank activities developed by Berger et al. (2022). The key advantage of this measure is that it takes into account all balance sheet activities and weighs bank assets and liabilities according to their contribution to liquidity hoarding. The total liquidity hoarding (LH) is therefore equal to:

$$\text{Total LH} = \text{LH (assets)} + \text{LH (liabilities)} = 1/2 \text{ liquid assets} - 1/2 \text{ illiquid assets} + 1/2 \text{ liquid liabilities} \quad (1)$$

From the assets side, *LH(assets)*, balance sheet items such as cash and securities receive a positive weight of +1/2 as banks hoard liquidity by holding this type of liquid assets. In contrast, when banks issue corporate loans, they hoard less liquidity. Therefore, illiquid assets enter with a negative weight of −1/2. The weights are assigned based on the logic that when a bank decides to increase its liquid assets (such as securities) by reducing illiquid assets (such as loans), it hoards liquidity of the same amount. In the same manner, from the liabilities side, banks can increase their liquid funds by taking, for instance, more demand deposits, which are liquid liabilities. As short-term liquid liabilities are typically used for financing short-term liquid assets, they receive a positive weight of +1/2 in the total bank liquidity hoarding measure.

We access detailed banks' financial statements from the Central Bank of Russia website, classifying all balance sheet items as either liquid, semi-liquid or illiquid assets and liabilities, taking into account Russia-specific factors. These factors, for example, permit us to exclude off-balance-sheet activities of Russian banks as they are impartially low in amounts, especially in the earlier period of our sample. A detailed description of balance sheet items classification in terms of their liquidity is provided in Panel B of Table 1. Following Berger et al. (2022), we normalize the total liquidity hoarding measure and its components by total assets for better comparability across banks.

Table 2 reports descriptive statistics for the normalized total bank liquidity hoarding as well as for its components on both the asset and liability sides. The mean value of the total LH/TA is 0.041, suggesting that an average bank in our sample was hoarding liquidity of about 4% of its total assets during the sample period. Nevertheless, we notice a large variation in total liquidity hoarding, which ranges from −0.26 to over 0.5.

To measure policy-related economic uncertainty, we rely on the Russian economic policy uncertainty (*EPU*) index developed by Baker et al. (2016).[i] This news-based measure of scaled frequency counts of newspaper articles contains economic and policy-related terms. The textual analysis is performed on news articles from Russia's largest daily newspaper *Kommersant*, the Russian analog of the UK's *Financial Times*. The EPU index is constructed on a monthly basis. In a manner similar to that of Berger et al. (2022), we convert to annual frequency by taking the natural logarithm of the arithmetic average over the twelve-month period (*Ln(EPU)*). The descriptive statistics for the economic policy uncertainty measure in Table 2 show that *Ln(EPU)* has a mean (median) of 4.939 (4.947) and ranges from 4.485 to 5.45, implying relatively high dispersion in the level of EPU in Russia over time. As an element of comparison, we can observe that economic policy uncertainty is slightly higher than in the US according to Berger et al. (2022) since in their work the mean is 4.642.

3.3 | Gender diversity measures

To measure board gender diversity, we rely on indicators employed in the previous literature (e.g., Owen & Temesvary, 2018). Our main gender diversity indicator is the Blau Index (Blau, 1977), which is measured as $1 - \sum_{i=1}^{n} P_i^2$, where P is the percentage of board members of each gender and n is the total number of board members. The index takes values from 0 to 0.5 indicating the variation in gender diversity from a non-diverse to a perfect 50/50 diversity. Unlike general measures of the number or the percentage of women on board, the Blau index captures the genuine gender diversity since boards consisting of 100% of only one gender would receive zero value in the index regardless of whether it consists solely of men or women.

We also employ the Shannon index (Shannon, 1948) as an alternative indicator of gender diversity. It is calculated like the Blau index, but consists of a logarithmic measure of diversity that makes it more sensitive to differences in the gender composition of boards. More formally, the Shannon index ranges from 0 to 0.693 and is measured as $-\sum_{i=1}^{n} P_i \ln(P)_i$, where P is also the percentage of board members of each gender.

Table 2 reports descriptive statistics for our gender diversity measures along with other executive board composition characteristics and bank-specific control variables used in the analysis. The statistics show a large heterogeneity across banks in terms of executive board composition and gender diversity. The percentage of women on boards

TABLE 2 Summary statistics.

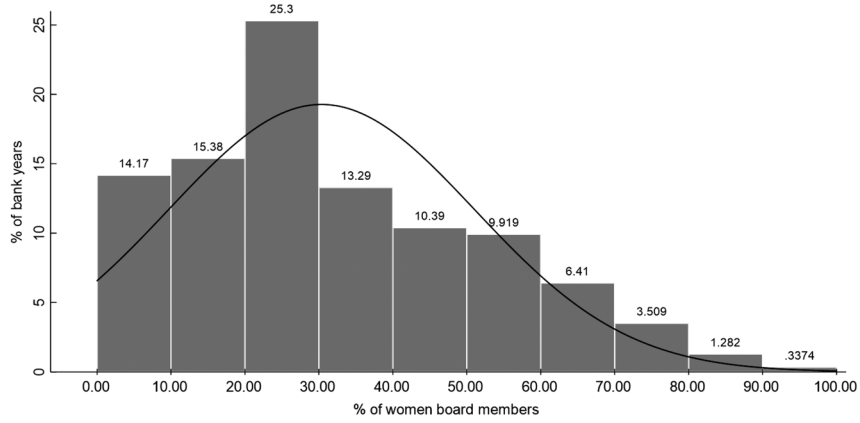
	N	Mean	SD	Min	p50	Max
Liquidity hoarding measures						
Total LH/TA	1482	0.041	0.127	−0.260	0.040	0.502
Asset-side LH/TA	1482	−0.095	0.115	−0.370	−0.104	0.434
Liability-side LH/TA	1482	0.136	0.065	0.004	0.130	0.377
Liquid assets/TA	1482	0.250	0.121	0.008	0.237	0.921
Illiquid assets/TA	1482	0.441	0.174	0.016	0.464	0.844
Liquid liabilities/TA	1482	0.272	0.130	0.007	0.260	0.754
Executive board characteristics						
Ln (1+N females)	1482	0.985	0.501	0.000	1.099	2.639
% female	1482	0.304	0.207	0.000	0.273	1.000
Blau index	1482	0.337	0.156	0.000	0.375	0.500
Shannon index	1482	0.498	0.214	0.000	0.562	0.693
Ln (board size)	1482	1.857	0.414	0.000	1.946	3.135
Ln (board age)	1482	3.794	0.099	3.507	3.795	4.104
Ln (1+board tenure)	1482	1.667	0.507	0.000	1.701	2.970
Female CEO (1/0)	1482	0.116	0.320	0.000	0.000	1.000
Foreign CEO (1/0)	1482	0.043	0.202	0.000	0.000	1.000
Ln (CEO age)	1482	3.808	0.177	3.401	3.784	4.543
Ln (1+CEO tenure)	1482	1.429	0.854	0.000	1.386	3.332
Industry average Blau index	1482	0.342	0.011	0.313	0.342	0.357
EPU and economic conditions						
Ln (EPU)	1482	4.939	0.326	4.485	4.947	5.450
Consumers expectations of economic situation (EES) (1/0)	1482	0.620	0.486	0.000	1.000	1.000
GDP growth (%)	1482	2.737	4.172	−7.800	4.024	8.500
Bank-level variables						
Ln (Total assets)	1604	17.836	1.726	10.856	17.771	23.971
Capital ratio	1604	0.127	0.068	−0.081	0.109	0.541
NPL/loans	1604	0.054	0.079	0.000	0.030	0.773
ROA	1604	0.012	0.020	−0.128	0.011	0.101

This table provides the descriptive statistics of all variables used in the estimations.

ranges from 0% to 100%, while the mean Blau index is about 0.34, implying that on average about a third of executive board members are women.

Figure 1 illustrates gender diversity on executive boards of our sample banks. Panel A shows the percentage of female board members, which indicates that women represent about 20%–30% of board members in about a quarter of our sample. About 14% of banks are composed of less than 10% female board members, while boards with over 50% of women constitute about a fifth of sample banks. Such distribution suggests that Russian banks have on average a higher representation of women on boards than in most countries. Kara et al. (2022) find that the board representation of women during the Covid-19 pandemic amounted to about 23% for the US and just over 30% for European banks.

Panel A. Women's representation on boards



Panel B. Blau gender diversity index

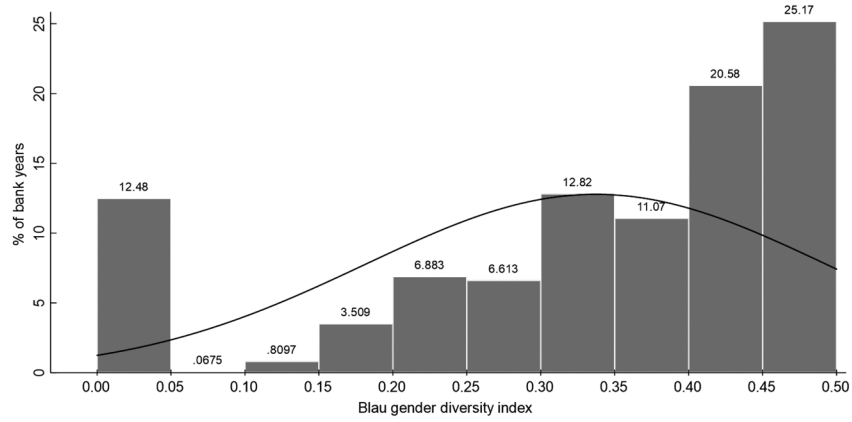


FIGURE 1 Gender diversity on bank executive boards. The figure shows the representation of women on bank executive boards of sample banks. Panel A shows the percentage of women on boards. The Blau gender diversity index is illustrated in Panel B. *Panel A. Women's representation on boards. Panel B. Blau gender diversity index*

A similar histogram but for the Blau gender diversity index is presented in Panel B of Figure 1. We observe that about 25% of sample banks have relatively well-diversified gender-wise executive boards. However, we note that gender diversity of bank executive boards in more than 12% of observations approaches zero. Overall, Figure 1 illustrates that our sample of Russian banks is very heterogeneous in terms of board gender diversity.

3.4 | Methodology

We test the effect of executive board composition on bank liquidity hoarding with two-way fixed panel regressions and estimate different specifications of the following model:

$$(LH/TA)_{i,t} = \alpha_i + \beta Board\ Gender\ Diversity_{i,t} + \gamma Board\ Characteristics_{i,t} + \theta CEO\ Characteristics_{i,t} + \varphi Bank\ Characteristics_{i,\,t-1} + \omega_i + \tau_t + \varepsilon_{i,t} \quad (2)$$

where *i* and *t* indicate a bank and a year. The main dependent variable, *LH/TA*, is either the total bank liquidity hoarding measure or one of its components, asset- or liability-side liquidity hoarding, normalized by gross total assets.

We use several alternative measures for *Board Gender Diversity*. Following Fan et al. (2019), we take the natural logarithm of the number of women (*Ln (N females)*) on board. As an alternative measure and in line with, for example, Adams and Ferreira (2009), we also consider the fraction of the executive board represented by women (*% females*). Given the previously observed non-linear effect of board gender diversity (see e.g., Fan et al., 2019), we also include squared terms of the number of women and percentage of women on boards. Finally, to assess the executive board gender diversity, we follow the earlier literature (see e.g., Owen & Temesvary, 2018) and compute the Blau Index (*Blau index*) in the main estimations and the Shannon Index (*Shannon index*) in robustness checks. We also assess the role of other board composition characteristics *(Board Characteristics)* and include the natural logarithms of the executive board size, average age, and tenure. To isolate the potential effect of Chief Executive Officers—*CEO Characteristics*—on bank liquidity hoarding, in some regression specifications we separately include controls for CEOs' gender, nationality, the natural logarithm of age and tenure.

We control for several bank-specific characteristics, *Bank Characteristics*, which are lagged by one year to avoid any simultaneity problems. Following the prior literature (see e.g., Berger et al., 2022), we control for bank size (natural logarithm of bank total assets) and capital ratio (equity-to-assets ratio). In addition, we include the ratio of nonperforming loans-to-total loans and return on assets (net income-to-total assets ratio) in order to control for bank risk and profitability. To control for unobserved time-invariant heterogeneity across banks and reduce potential biases related to omitted variables, e include bank-fixed effects (ω_i). Any remaining time-varying factors that may systematically affect bank liquidity hoarding should be captured by year-fixed effects (τ_t).

To examine the role of executive board composition and bank liquidity hoarding during episodes of high economic uncertainty, we estimate regressions of the following form:

$$(LH/TA)_{i,t} = \alpha_i + \beta Board\ Gender\ Diversity_{i,t} + \mu EPU_t + \rho(Board\ Gender\ Diversity \times EPU)_{i,t} + \gamma Board\ Characteristics_{i,t} + \theta CEO\ Characteristics_{i,t} + \varphi Bank\ Characteristics_{i,\,t-1} + \tau Economic\ conditions_{i,t-1} + \omega_i + \varepsilon_{i,t} \quad (3)$$

where *EPU* is the natural logarithm of the EPU news-based index (Baker et al., 2016) and *(Board Gender Diversity × EPU)* is the interaction term of the EPU index and board gender diversity measures. The rest of the board composition measures and control variables is the same as in the above specifications. In these models, we include bank-fixed effects but not time-fixed effects as the EPU index is significantly correlated with year dummy variables.[ii] Instead, we include proxies for general economic development. Following prior literature that shows that bank liquidity creation is procyclical (see e.g., Davydov et al., 2018), we control for general economic development by including the lagged rate of real GDP growth in our models. In some of the alternative specifications, we also include an economic recession dummy variable to account for the occurrence of economic downturns during our sample period.

We acknowledge the potential endogeneity concerns with these estimations. To address omitted variables bias, we saturate our regressions with extensive controls at the bank, the CEO, the board level, and bank fixed effects in all estimations. We also employ the propensity score matching (PSM) estimation technique to reduce sample selection bias. Reverse causality concerns, in turn, are reduced through our framework design. First, liquidity hoarding could affect economic policy uncertainty. However, liquidity hoarding occurs at the bank level, while economic policy uncertainty is a national-level issue. The vast majority of Russian banks are small, which reduces the potential effect of average changes in liquidity hoarding among banks on economic policy uncertainty. Second, although liquidity hoarding is unlikely to affect board gender diversity, we ensure that our results are not driven by the reverse causality problem with the instrumental variable (IV) approach. Following prior literature that uses the industry average of the primary independent variable as an instrument (e.g., Liu et al., 2014), we instrument the Blau index of an individual bank in a given year with the mean value of industry-level diversity indicators in the same year. Due to the similarity of

business models and investment opportunities, bank board composition is likely to be correlated across industry peers, but industry averages are unlikely to directly affect bank-level liquidity hoarding.

4 | RESULTS

4.1 | The influence of board gender diversity on liquidity hoarding

We start our analysis by investigating the influence of board gender diversity on liquidity hoarding. Table 3 reports the results. We consider five different specifications, based on the variables for gender diversity and the set of control variables, to test the sensitivity of our results. The first and third specifications include the number of women on the board (*Ln (1+N females)*) and its squared term. The second and fourth specifications include the percentage of women on the board (*% female*) and its squared term. The first and second specifications exclude CEO-specific variables while the third and fourth specifications include these variables. Finally, the fifth specification uses the Blau index to measure gender diversity.

We find evidence for a reverse U-shape relation between gender diversity and liquidity hoarding. In the first four specifications, the linear term is significantly positive and the squared term is significantly negative. These results mean that the greater presence of women on boards favors liquidity hoarding up to a certain value, above which the greater presence of women on boards disfavours liquidity hoarding. In order to evaluate the relation between board gender diversity and liquidity hoarding, we calculate the maximum of the quadratic function for the fourth specification (with *% female* and CEO-specific variables) and compare it with the distribution of data. The maximum equals to 41.8%. Since the maximum value for % females is 100% and the median value is 27.3% (the mean value is 30.4%), we observe the nonlinear relation with the values of the sample. The maximum value of 41.8% for the percentage of women on the board also provides support for the influence of gender diversity on liquidity hoarding. The final specification with the Blau index confirms the influence of board gender diversity on liquidity hoarding—it is significant and positive. These results provide support for the fact that the presence of women on bank boards tends to increase liquidity hoarding up to a certain threshold.

In analysing other explanatory variables, we note that most control variables are not significant. Bank-specific and board-specific variables are not significant. Among CEO- specific variables, two exert a significant influence on liquidity hoarding: *CEO age* is significantly positive and *CEO tenure* is significantly negative in all specifications. In other words, older CEOs and CEOs with longer tenure tend to hoard more liquidity.

4.2 | The effect of board gender diversity on the relation of EPU and liquidity hoarding

We now turn to the key question of the paper: the influence of board gender diversity on the relation between economic policy uncertainty and liquidity hoarding. As discussed in Section 3.3, we use the Blau index as the primary indicator for gender diversity.

Table 4 reports these estimations. We perform several tests. The first model considers only *EPU* and bank-level controls. The second model adds the Blau index and board-specific variables. The third model includes also CEO-specific variables. The fourth model adds the interaction term between *EPU* and *Blau index*. Finally, the fifth and sixth models add a dummy variable for recession years (2008, 2009, 2014, 2015) and real GDP growth rate to take into account the occurrence of a recession and general economic conditions in the results.

Several findings emerge. First, we observe that board gender diversity is associated with higher liquidity hoarding. *Blau index* has a significantly positive coefficient in all estimations. It corroborates our previous findings about the positive relation between gender diversity on the board and liquidity hoarding.

TABLE 3 Board gender diversity and bank liquidity hoarding.

	Total LH/TA				
	(1)	(2)	(3)	(4)	(5)
Ln (1+N females)	0.062***		0.072***		
	(0.022)		(0.022)		
Ln (1+N females)^2	−0.031**		−0.035***		
	(0.013)		(0.013)		
% female		0.108*		0.123**	
		(0.063)		(0.062)	
% female^2		−0.134		−0.147*	
		(0.087)		(0.088)	
Blau index					0.056*
					(0.030)
Board size	−0.021	−0.023*	−0.019	−0.021	−0.020
	(0.015)	(0.013)	(0.016)	(0.013)	(0.013)
Board age	−0.022	−0.023	−0.088	−0.086	−0.092
	(0.076)	(0.077)	(0.082)	(0.083)	(0.083)
Board tenure	−0.000	−0.000	0.008	0.009	0.008
	(0.012)	(0.012)	(0.013)	(0.013)	(0.014)
Female CEO			−0.021	−0.018	−0.021
			(0.020)	(0.021)	(0.020)
Foreign CEO			0.021	0.024	0.022
			(0.015)	(0.016)	(0.016)
CEO age			0.097**	0.089**	0.088**
			(0.041)	(0.041)	(0.041)
CEO tenure			−0.012*	−0.012*	−0.011*
			(0.006)	(0.006)	(0.006)
Bank size	−0.010	−0.010	−0.010	−0.010	−0.009
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Capital ratio	−0.005	0.007	0.010	0.014	0.013
	(0.094)	(0.097)	(0.094)	(0.096)	(0.096)
NPL/TL	0.043	0.049	0.047	0.052	0.051
	(0.080)	(0.080)	(0.080)	(0.080)	(0.081)
ROA	0.227	0.222	0.189	0.187	0.184
	(0.163)	(0.165)	(0.162)	(0.165)	(0.165)
Constant	0.326	0.340	0.215	0.247	0.260
	(0.391)	(0.393)	(0.387)	(0.388)	(0.389)
N. of obs.	1482	1482	1482	1482	1482
N. of banks	149	149	149	149	149

(Continues)

TABLE 3 (Continued)

	Total LH/TA				
	(1)	(2)	(3)	(4)	(5)
Adj. R-squared	0.064	0.060	0.079	0.073	0.073
Bank FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes

This table presents the results of fixed-effects regressions examining the relation between board gender diversity and liquidity hoarding. Heteroskedasticity robust standard errors (in parentheses) are clustered at the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Second, we find that economic policy uncertainty exerts a non-significant impact on liquidity hoarding when considered in isolation (columns (1) to (3)). However, the inclusion of board gender diversity exerts an influence on the relation between *EPU* and liquidity hoarding. The coefficient of *EPU*×*Blau index* is significantly negative while the coefficient of *EPU* is significantly positive in all specifications that include the interaction term (columns (4)—(6)). This finding suggests that the effect of *EPU* on liquidity hoarding may be conditional on board gender diversity and that the non-significant impact of *EPU* when considered alone in the estimations may be misleading. This result helps reconcile our findings with those of Berger et al. (2022) for US banks. In the case of US banks, board gender diversity is lower than in Russian banks. As a consequence, our result that economic policy uncertainty increases liquidity hoarding only up to a certain value of board gender diversity accords with the finding that economic policy uncertainty boosts liquidity hoarding.

Overall, the findings reported in Table 4 support our hypothesis that greater board gender diversity reduces the impact of economic policy uncertainty on liquidity hoarding. We explain this conclusion by the influence of board gender diversity on the stability and overreaction in decision-making. The greater cognitive variety of a more diverse board bolsters bank performance, which makes banks better prepared for more volatile periods. It can thus contribute to the outperformance of banks during uncertain times by avoiding overreaction that hampers performance. Diverse boards possess higher accountability and transparency (Arnaboldi et al., 2021; Baselga-Pascual et al., 2018), thereby reducing the need to hoard liquidity in troubled times.

This result is illustrated in Figure 2, which plots the EPU index and liquidity hoarding of banks with high (75th percentile of the Blau index) and low (25th percentile of the Blau index) levels of board gender diversity over time. Notably, as can be seen from the figure, liquidity hoarding by banks with low levels of board gender diversity is much more volatile compared to banks with high levels of diversity.

Our key finding here that board gender diversity reduces the influence of economic policy uncertainty on bank liquidity hoarding raises a new question: Can the effect of board gender diversity rise high enough to turn the positive effect of *EPU* into a negative one? To this end, we compute the value of board gender diversity above which the positive effect of *EPU* becomes a negative one.

The total effect of *EPU* on liquidity hoarding is the sum of the coefficient for *EPU* and the coefficient for the interaction term *EPU*×*Blau index* multiplied by the value of *Blau index*. If we consider the estimation with all variables (column 6 of Table 4), the computation of the threshold for the Blau index leads to a value of 37.2%. This value is above the mean of the Blau index for the sample (33.7%) and is lower than the maximal value (50%). We can thus conclude that the sign of the overall effect of *EPU* on liquidity hoarding is conditional to the level of board gender diversity. Economic policy uncertainty increases liquidity hoarding when diversity is low, but exerts a negative impact when diversity is high.

In the context of the Russian banking industry where gender diversity tends to be fairly high by international standards, we note evidence of banks for which increased economic policy uncertainty tends to reduce liquidity hoarding.

In analysing other explanatory variables, we note again that older CEOs tend to hoard liquidity, while CEOs with longer tenures tend to hoard less liquidity. We further note a significantly positive coefficient for the non-performing

TABLE 4 Board gender diversity, economic policy uncertainty, and bank liquidity hoarding.

	Total LH/TA					
	(1)	(2)	(3)	(4)	(5)	(6)
EPU	0.005	0.004	0.001	0.054*	0.063*	0.055*
	(0.020)	(0.020)	(0.019)	(0.032)	(0.033)	(0.033)
Blau index		0.054*	0.063**	0.819**	0.814**	0.800**
		(0.032)	(0.031)	(0.354)	(0.357)	(0.355)
EPU × Blau index				−0.153**	−0.152**	−0.148**
				(0.070)	(0.071)	(0.070)
Board size		−0.022*	−0.021	−0.019	−0.019	−0.018
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Board age		−0.021	−0.080	−0.083	−0.089	−0.088
		(0.074)	(0.082)	(0.082)	(0.081)	(0.081)
Board tenure		0.001	0.009	0.010	0.008	0.008
		(0.012)	(0.014)	(0.014)	(0.014)	(0.014)
Female CEO			−0.026	−0.025	−0.022	−0.023
			(0.020)	(0.020)	(0.020)	(0.020)
Foreign CEO			0.026	0.027*	0.026*	0.027
			(0.017)	(0.016)	(0.015)	(0.016)
CEO age			0.088**	0.087**	0.083**	0.087**
			(0.042)	(0.042)	(0.041)	(0.042)
CEO tenure			−0.011*	−0.011*	−0.010	−0.010*
			(0.006)	(0.006)	(0.006)	(0.006)
Bank size	−0.011	−0.011	−0.012	−0.013	−0.012	−0.016*
	(0.009)	(0.009)	(0.008)	(0.008)	(0.008)	(0.009)
Capital ratio	0.054	0.045	0.056	0.052	0.037	0.029
	(0.098)	(0.100)	(0.098)	(0.099)	(0.096)	(0.099)
NPL/TL	0.142*	0.131*	0.132*	0.131*	0.073	0.117
	(0.078)	(0.077)	(0.078)	(0.078)	(0.079)	(0.078)
ROA	0.175	0.213	0.171	0.168	0.158	0.250
	(0.178)	(0.183)	(0.179)	(0.180)	(0.169)	(0.177)
Recession (2008-09, 2014–15)					−0.028***	
					(0.004)	
GDP growth						−0.002***
						(0.001)
Constant	0.202	0.297	0.211	−0.023	−0.019	0.073
	(0.124)	(0.296)	(0.291)	(0.294)	(0.290)	(0.295)
N. of obs.	1482	1482	1482	1482	1482	1482
N. of banks	149	149	149	149	149	149

(Continues)

TABLE 4 (Continued)

	Total LH/TA					
	(1)	(2)	(3)	(4)	(5)	(6)
Adj. *R*-squared	0.018	0.024	0.039	0.046	0.068	0.052
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes

This table presents the results of fixed-effects regressions examining the relation between economic policy uncertainty, board gender diversity and liquidity hoarding. Heteroskedasticity robust standard errors (in parentheses) are clustered at the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

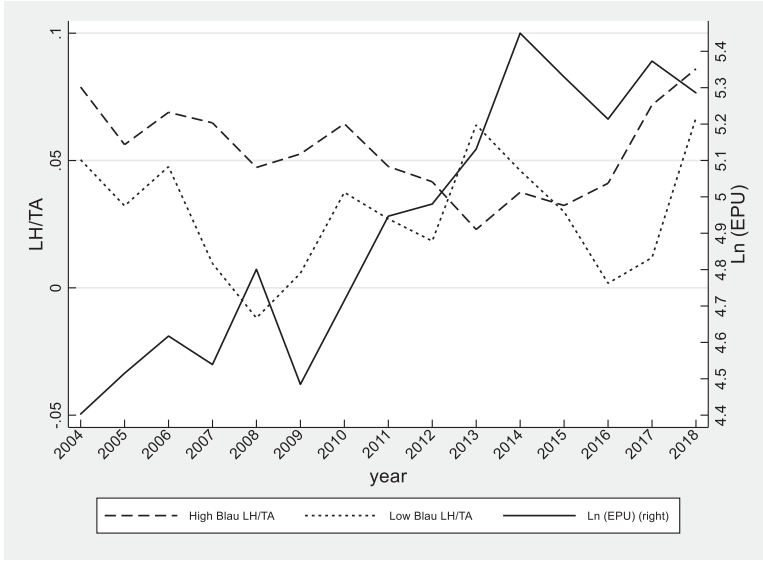


FIGURE 2 EPU, board gender diversity, and bank liquidity hoarding. The figure plots the development of the EPU index and liquidity hoarding to total assets ratio of banks with high and low levels of the board gender diversity. Banks with high board gender diversity are those with the Blau index in the top 75th percentile of distribution (Blau index ≥ 0.48). Banks in the bottom 25th percentile (Blau index below or equal to 0.27), are classified as banks with low board gender diversity

loans ratio in four out of six specifications. This observation can be explained by the fact that a greater share of bad loans in the portfolio of loans leads the bank to reduce its lending, thereby increasing its liquidity hoarding.

4.3 | Components of liquidity hoarding

As explained, liquidity hoarding is a broad measure that takes into account liquidity hoarded on both the asset side and liability side. We dig deeper into our finding on the influence of board gender diversity on the relation between economic policy uncertainty and liquidity hoarding by examining which component of liquidity hoarding is affected.

Table 5 gives the asset-side and liability-side results for liquidity hoarding, as well as the ratios of liquid assets to total assets, illiquid assets to total assets, and liquid liabilities to total assets.

First, the estimations considering separately the asset-side and the liability-side of liquidity hoarding provide information about which side of the balance sheet of the bank is influenced by the degree of board gender diversity. We find evidence that the influence of board gender diversity occurs on the asset-side of liquidity hoarding. *EPU* is significantly

TABLE 5 Board gender diversity, economic policy uncertainty, and components of bank liquidity hoarding

	Asset side LH	Liability side LH	Liquid assets/TA	Illiquid assets/TA	Liquid liabilities/TA
	(1)	(2)	(3)	(4)	(5)
EPU	0.067**	−0.012	0.053*	−0.079**	−0.024
	(0.029)	(0.015)	(0.032)	(0.035)	(0.030)
Blau index	0.632**	0.163	0.729**	−0.535	0.327
	(0.299)	(0.179)	(0.287)	(0.388)	(0.358)
EPU × Blau index	−0.115*	−0.033	−0.134**	0.097	−0.067
	(0.060)	(0.036)	(0.059)	(0.077)	(0.071)
Board size	−0.026**	0.007	−0.001	0.050***	0.014
	(0.011)	(0.007)	(0.015)	(0.014)	(0.015)
Board age	−0.084	−0.005	−0.042	0.125	−0.010
	(0.078)	(0.034)	(0.055)	(0.126)	(0.069)
Board tenure	0.009	−0.001	0.008	−0.010	−0.002
	(0.011)	(0.007)	(0.013)	(0.015)	(0.014)
Female CEO	−0.013	−0.010	−0.006	0.021	−0.020
	(0.020)	(0.009)	(0.022)	(0.022)	(0.018)
Foreign CEO	0.022**	0.005	0.009	−0.035**	0.010
	(0.009)	(0.012)	(0.012)	(0.014)	(0.024)
CEO age	0.081**	0.006	0.079**	−0.083	0.012
	(0.040)	(0.018)	(0.034)	(0.059)	(0.036)
CEO tenure	−0.012**	0.001	−0.007	0.016*	0.002
	(0.006)	(0.003)	(0.005)	(0.009)	(0.005)
Bank size	−0.002	−0.014***	−0.009	−0.005	−0.028***
	(0.007)	(0.004)	(0.011)	(0.009)	(0.007)
Capital ratio	0.007	0.021	0.095	0.080	0.043
	(0.082)	(0.058)	(0.102)	(0.106)	(0.115)
NPL/TL	0.218***	−0.102***	0.148*	−0.288***	−0.203***
	(0.072)	(0.024)	(0.087)	(0.083)	(0.048)
ROA	0.206	0.044	0.229	−0.183	0.088
	(0.172)	(0.075)	(0.196)	(0.240)	(0.150)
GDP growth	−0.003***	0.001***	−0.002***	0.004***	0.002***
	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Constant	−0.351	0.424***	−0.030	0.672*	0.848***
	(0.253)	(0.140)	(0.261)	(0.350)	(0.279)
N. of obs.	1482	1482	1482	1482	1482
N. of banks	149	149	149	149	149
Adj. *R*-squared	0.144	0.306	0.048	0.197	0.306
Bank FE	Yes	Yes	Yes	Yes	Yes

This table presents the results of fixed-effects regressions examining the relation between economic policy uncertainty, board gender diversity and liquidity hoarding. Heteroskedasticity robust standard errors (in parentheses) are clustered at the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

positive and *EPU×Blau index* is significantly negative only when explaining the asset side of liquidity hoarding. They are not significant when explaining the liability side of liquidity hoarding.

Second, the estimations considering the ratios of balance sheet items provide additional information about the components of the balance sheet which are affected. The absence of a significant coefficient for *EPU×Blau index* confirms the lack of effect on the liability side for liquidity hoarding. However, the effect of board gender diversity acts through liquid assets, not illiquid assets. Thus, the coefficient of *EPU×Blau index* is significantly negative when explaining the ratio of liquid assets to total assets, but not significant when explaining the ratio of illiquid assets to total assets.

These results suggest that greater board gender diversity reduces the impact of economic policy uncertainty on liquid assets, but does not influence the effect of economic policy uncertainty on illiquid assets. These findings imply that greater board gender diversity affects the hoarding behaviour of banks through liquid assets such as holding cash or marketable securities. It does not affect liquidity hoarding through illiquid assets such as the granting of loans.

In a nutshell, the key channel through which board gender diversity affects the impact of economic policy uncertainty on liquidity hoarding takes place via the hoarding of liquid assets. More diverse boards are less prone to hoarding of liquid assets in the presence of greater economic policy uncertainty.

4.4 | Robustness tests

We perform several robustness checks to test the sensitivity of our results. First, we use two alternative measures for economic policy uncertainty: *(i)* an index of consumer expectations about the economy, and *(ii)* the economic sanctions regime imposed on the Russian banking sector in 2014.

The index of consumer expectations is calculated by Russia's Federal State Statistics Service (Rosstat) based on surveys of 5,000 people about their expectations regarding short-term (within a year) economic changes in Russia. As the index is updated quarterly, we annualize the index by taking the arithmetic average over the four quarters of a year. We transform the index into a dummy variable, which takes the value of one in case of negative expectations and zero in opposite instances (*EES*).

Many countries imposed restrictive measures on Russia after its actions in Ukraine and the illicit annexation of Crimea in 2014. The resulting sanctions regime barred Russia's largest Russian banks from access to longer-term financing from the European and US financial markets. Although only eight banks were directly sanctioned in 2014, these measures had a drastic effect on Russia's banking sector as a whole, forcing even non-sanctioned banks to alter their behaviour (e.g., Mamonov et al., 2021). Economic sanctions also had a sizable effect on policy uncertainty. As shown in Figure 2, the EPU index reached its highest level during the implementation of sanctions, surpassing even the levels seen during the financial crisis of 2008. Therefore, we consider the sanctions regime as the period of increased economic uncertainty and include a dummy variable (*Post sanctions*) that takes a value of one during 2014–2018. Since the behaviour of the directly sanctioned banks may be biased because of the state intervention and direct capital support of these banks, we exclude observations of banks targeted by imposed sanctions after 2014 from this part of the analysis.

We redo the estimations in Table 6. In columns (1)-(3), we consider the consumers' expectations index, while the sanctions regime is taken into account in columns (4)-(6). We consider the specification with all control variables and test alternatively the asset-side effects of liquidity hoarding and the liability-side effects of liquidity hoarding. We find confirmation of our key results with both of our alternative measures of economic policy uncertainty. On the one hand, economic policy uncertainty exerts a positive impact on liquidity hoarding which is reduced in presence of greater board gender diversity. On the other hand, this finding only stands for the asset-side effects of liquidity hoarding.

Second, we consider alternative measures for gender diversity. Table 7 reports these estimations. In the first column, we consider the Shannon index to assess board gender diversity. In the second column, we adopt the percentage of women on the board (*% female*). In the third column, we combine the linear term and the squared term of *% female*.

TABLE 6 Alternative measures of economic policy uncertainty

	Total LH	Asset side LH	Liability side LH	Total LH	Asset side LH	Liability side LH
	(1)	(2)	(3)	(4)	(5)	(6)
EES	0.027***	0.030***	−0.003			
	(0.010)	(0.008)	(0.006)			
Post sanctions				0.029*	0.037***	−0.008
				(0.017)	(0.013)	(0.010)
Blau index	0.096**	0.083***	0.012	0.077**	0.077**	0.0004
	(0.038)	(0.031)	(0.019)	(0.037)	(0.030)	(0.018)
EES × Blau index	−0.056*	−0.036*	−0.020			
	(0.029)	(0.022)	(0.017)			
Post sanctions × Blau index				−0.079**	−0.062**	−0.016
				(0.040)	(0.030)	(0.026)
Board size	−0.020	−0.028**	0.007	−0.016	−0.020*	0.004
	(0.013)	(0.011)	(0.007)	(0.014)	(0.011)	(0.007)
Board age	−0.092	−0.080	−0.011	−0.087	−0.072	−0.015
	(0.080)	(0.078)	(0.035)	(0.082)	(0.079)	(0.035)
Board tenure	0.008	0.009	−0.002	0.008	0.009	−0.0003
	(0.014)	(0.012)	(0.007)	(0.015)	(0.011)	(0.007)
Female CEO	−0.024	−0.013	−0.010	−0.021	−0.009	−0.012
	(0.020)	(0.020)	(0.009)	(0.021)	(0.020)	(0.009)
Foreign CEO	0.027	0.021**	0.006	0.027	0.021**	0.005
	(0.016)	(0.010)	(0.012)	(0.016)	(0.009)	(0.013)
CEO age	0.088**	0.085**	0.003	0.084**	0.074*	0.010
	(0.042)	(0.041)	(0.019)	(0.042)	(0.041)	(0.019)
CEO tenure	−0.010*	−0.012**	0.002	−0.011*	−0.012**	0.002
	(0.006)	(0.006)	(0.003)	(0.006)	(0.006)	(0.003)
Bank size	−0.016**	0.001	−0.017***	−0.013*	0.005	−0.018***
	(0.007)	(0.005)	(0.003)	(0.007)	(0.006)	(0.003)
Capital ratio	0.024	0.007	0.017	0.034	0.005	0.029
	(0.097)	(0.080)	(0.057)	(0.101)	(0.080)	(0.058)
NPL/TL	0.113	0.223***	−0.110***	0.114	0.221***	−0.107***
	(0.078)	(0.072)	(0.024)	(0.079)	(0.072)	(0.022)
ROA	0.267	0.248	0.019	0.217	0.178	0.039
	(0.176)	(0.173)	(0.077)	(0.180)	(0.175)	(0.077)
GDP growth	−0.002***	−0.003***	0.001***	−0.001***	−0.003***	0.001***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Constant	0.344	−0.116	0.459***	0.282	−0.186	0.468***
	(0.287)	(0.247)	(0.139)	(0.311)	(0.264)	(0.143)
N. of obs.	1482	1482	1482	1442	1442	1442
N. of banks	149	149	149	149	149	149
Adj. R-squared	0.049	0.146	0.304	0.038	0.150	0.325
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes

This table presents the results of fixed-effects regressions examining the relation between economic policy uncertainty, board gender diversity and liquidity hoarding. Heteroskedasticity robust standard errors (in parentheses) are clustered at the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

TABLE 7 Alternative gender diversity measures.

	Total LH/TA		
	(1)	(2)	(3)
EPU	0.060*	0.024	0.056*
	(0.033)	(0.030)	(0.032)
Shannon index	0.606**		
	(0.252)		
EPU × Shannon index	−0.113**		
	(0.050)		
% female		0.353	1.800**
		(0.367)	(0.733)
EPU × % female		−0.067	−0.336**
		(0.073)	(0.147)
% female^2			−2.025*
			(1.058)
EPU × % female^2			0.377*
			(0.214)
Board size	−0.019	−0.016	−0.019
	(0.013)	(0.013)	(0.013)
Board age	−0.089	−0.092	−0.080
	(0.081)	(0.082)	(0.081)
Board tenure	0.008	0.008	0.009
	(0.014)	(0.014)	(0.014)
Female CEO	−0.023	−0.023	−0.020
	(0.020)	(0.021)	(0.021)
Foreign CEO	0.027*	0.025	0.027
	(0.016)	(0.017)	(0.017)
CEO age	0.088**	0.085**	0.089**
	(0.041)	(0.042)	(0.041)
CEO tenure	−0.011*	−0.010	−0.011*
	(0.006)	(0.006)	(0.006)
Bank size	−0.016*	−0.015*	−0.017**
	(0.009)	(0.009)	(0.008)
Capital ratio	0.029	0.031	0.028
	(0.099)	(0.098)	(0.098)
NPL/TL	0.116	0.115	0.116
	(0.078)	(0.077)	(0.077)
ROA	0.249	0.248	0.250
	(0.177)	(0.175)	(0.174)
GDP growth	−0.002***	−0.002***	−0.002***
	(0.001)	(0.001)	(0.001)

(Continues)

TABLE 7 (Continued)

	Total LH/TA		
	(1)	(2)	(3)
Constant	0.041	0.237	0.044
	(0.296)	(0.291)	(0.296)
N. of obs.	1482	1482	1482
N. of banks	149	149	149
Adj. R-squared	0.054	0.042	0.052
Bank FE	Yes	Yes	Yes

This table presents the results of fixed-effects regressions examining the relation between economic policy uncertainty, board gender diversity and liquidity hoarding. Heteroskedasticity robust standard errors (in parentheses) are clustered at the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

The use of the Shannon index confirms our findings. We again observe a significant and positive coefficient for *EPU* and a significant and negative coefficient for *EPU*×*Shannon index*. The results are more complex for *% female*. The interaction of *% female* with *EPU* is not significant when considered alone as a linear term in column (2). However, when including the linear term and the squared term, we obtain a significantly negative coefficient for *EPU*×*% female* and a significantly positive coefficient for *EPU*×*% female*^{2}, while the coefficient for *EPU* is significantly positive. These results support the view that economic policy uncertainty increases liquidity hoarding, while gender diversity measured as percentage of women on the board reduces this effect. However, this moderating effect of gender diversity is only observed up to a certain level of gender diversity, beyond which the influence of gender diversity tends to amplify the positive effect of economic policy uncertainty on liquidity hoarding.

While our results are unlikely to be influenced by unobservable omitted variables due to the inclusion of bank fixed effects in all our specifications, there is still a possibility that certain banks strategically choose their board structure to align better with their business models. To mitigate the potential for sample selection bias, we employ the propensity score matching (PSM) approach. Specifically, we divide the sample into quartiles based on the Blau index and categorize observations in the top quartile as the 'treated' group. Subsequently, we match each bank-year observation in the treatment group with the nearest observation from the remaining Blau index distribution, taking into account bank-specific characteristics.

Panel A of Table 8 presents the estimates of the logit models (columns (1) and (2)), where the dummy variable indicating the treatment group is regressed on the set of control variables. Notably, the high Blau index is positively related to bank size, capital ratio, and the likelihood of a bank having a female CEO. Although the effects of other bank-specific characteristics are not statistically significant, we match bank-year observations based on all financial characteristics and CEO-level variables using one-to-one matching of treated observation with the closest neighbour from the control group without replacement. The estimation results based on the matched sample are presented in column (3) in Panel A of Table 8. Consistent with our previous findings, we still observe that banks with high levels of board gender diversity hoard more liquidity while the coefficient for *EPU*×*High Blau index* remains negative and statistically significant. These results provide evidence to suggest that board gender diversity reduces the negative effects associated with EPU in terms of liquidity hoarding among otherwise comparable banks.

Finally, we alleviate endogeneity concerns arising from the fact that bank liquidity hoarding and board gender composition may be jointly determined. If banks are reconfiguring their executive boards due to their liquidity hoarding decisions, for example, due to bad performance of their assets related to specific changes in their holdings of liquid or illiquid assets, the observed relationship may be subject to the reverse causality problem. Building on prior literature that utilizes the industry average of the focal independent variable as an instrument (e.g., Liu et al., 2014), we employ the industry-level mean value of the diversity indicator as the instrument for the bank-specific Blau index. Because of

TABLE 8 Additional robustness tests addressing endogeneity concerns

Panel A: Propensity score matching (PSM) approach			
	High Blau (Logit) (1)	High Blau (Logit) (2)	Total LH/TA (OLS) (3)
EPU		1.944***	0.002
		(0.465)	(0.021)
High Blau index			0.191*
			(0.113)
EPU × High Blau index			−0.038*
			(0.023)
Board size	1.224	1.172	−0.018
	(0.199)	(0.187)	(0.013)
Board age	0.284	0.366	−0.124
	(0.259)	(0.330)	(0.075)
Board tenure	1.143	1.157	0.006
	(0.194)	(0.196)	(0.014)
Female CEO	3.800***	3.890***	−0.027**
	(0.673)	(0.690)	(0.013)
Foreign CEO	0.724	0.710	0.037
	(0.259)	(0.252)	(0.028)
CEO age	1.049	1.019	0.120***
	(0.504)	(0.489)	(0.040)
CEO tenure	1.084	1.083	−0.009
	(0.105)	(0.103)	(0.007)
Bank size	0.723***	0.750***	−0.016***
	(0.036)	(0.036)	(0.006)
Capital ratio	0.080**	0.084**	−0.110
	(0.097)	(0.101)	(0.093)
NPL/TL	0.517	0.859	0.329***
	(0.525)	(0.808)	(0.083)
ROA	23.446	13.423	0.169
	(87.59)	(50.64)	(0.222)
GDP growth		0.980	−0.002**
		(0.153)	(0.001)
Constant	3630.49	60.07	0.369
	(10051.3)	(160.3)	(0.245)
N. of obs.	1482	1482	800
N. of banks	149	149	141
Pseudo or Adj. R-squared	0.076	0.070	0.081
Bank FE	No	No	Yes
Time FE	Yes	No	No

(Continues)

TABLE 8 (Continued)

Panel B: Instrumental variable (IV) analysis				
	Blau index		Total LH/TA	
	(1)	(2)	(3)	(4)
	First stage IV	First stage IV	2SLS	2SLS
Industry average Blau index	0.679*	0.757**		
	(0.363)	(0.373)		
Instrumented Blau index			0.634*	10.904*
			(0.373)	(5.815)
EPU × Instrumented Blau index				−2.046*
				(1.147)
EPU		0.013		0.697*
		(0.022)		(0.405)
Board characteristics	Yes	Yes	Yes	Yes
CEO characteristics	Yes	Yes	Yes	Yes
Bank characteristics	Yes	Yes	Yes	Yes
Economic conditions	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
N. of obs.	1482	1482	1482	1482
N. of banks	149	149	149	149
Adj. R-squared	0.063	0.063	0.024	0.018
Bank FE	Yes	Yes	Yes	Yes

This table presents the results of the propensity score matching approach (Panel A) and instrumental variables analysis (Panel B). The matching technique is based on one-to-one nearest-neighbour matching without replacement. The instrumental variable analysis uses the industry-level mean value of Blau index. Heteroskedasticity robust standard errors (in parentheses) are clustered at the bank level. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

the resemblance in business models and investment prospects, the composition of bank boards will likely display correlations among industry counterparts. However, it is improbable that the industry average level of diversity will have a direct impact on the bank-specific levels of liquidity hoarding.

We perform this analysis in Panel B of Table 8. The validity of our instrument is tested in columns (1) and (2) which report the first-stage regressions where the dependent variable is the bank-level Blau index. In both specifications, the coefficient of the industry average Blau index is positive and statistically significant, which validates our assumption on the correlation of bank board compositions among industry peers. Columns (3) and (4) show the estimation coefficients of the second stage of IV analysis. We again observe a significant and positive coefficient for both *EPU* and *Instrumented Blau index*, and a significant and negative coefficient for *EPU* × *Instrumented Blau index*, which confirms our baseline results.

These robustness tests overall tend to support our findings that economic policy uncertainty exerts a positive influence on liquidity hoarding that is moderated by board gender diversity.

5 | CONCLUSION

In this paper, we consider whether board gender diversity can affect the relation between economic policy uncertainty (EPU) and liquidity hoarding. Employing a unique dataset of large Russian commercial banks for which about 30% of

executive board members are women, as well as the newspaper-based EPU index developed by Baker et al. (2016) and the bank liquidity hoarding measures proposed by Berger et al. (2022), we perform bank-level regressions for the period 2004–2018. We find that economic policy uncertainty increases liquidity hoarding. However, this effect attenuates as board gender diversity rises. We explain this finding by the influence of board gender diversity on stability and overreaction in decision-making. Furthermore, we observe that the channel through which board gender diversity affects the impact of economic policy uncertainty on liquidity hoarding takes place via the hoarding of liquid assets. Our findings are robust to the use of alternative measures for economic policy uncertainty and gender diversity.

Our conclusions are broadly applicable to the banking industry. The impact of EPU on liquidity hoarding leads to adverse effects of increased EPU on the real economy. By increasing liquidity hoarding, higher EPU diminishes the supply of credit. Thus, our results support policies favouring board gender diversity to attenuate the detrimental effects of economic policy uncertainty. While our study offers valuable insights into the Russian banking industry, the observed relationships are also applicable to countries sharing similar economic, regulatory, and cultural profiles. Nevertheless, the result should be generalized with caution by considering factors such as the distinct geopolitical and economic landscape in Russia, which may differ significantly from other countries. Future research could concentrate on exploring cross-country variation in EPU and bank board gender diversity. A cross-country analysis has the potential to contribute to a more comprehensive understanding of the factors influencing the examined relationship between EPU and bank liquidity hoarding. Furthermore, the influence of board gender diversity on the determinants of liquidity hoarding as well as the relations between economic policy uncertainty, liquidity hoarding, and other forms of board diversity are all areas worthy of further investigation.

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ENDNOTES

[i] http://www.policyuncertainty.com/russia_monthly.html.

[ii] For the sake of robustness, we also re-estimate these models with time-fixed effects included. This inclusion does not qualitatively affect our main results and hence we do not report these estimates.

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