Pastorek, Daniel; Mazůrková, Dajana

Article

The heterogeneity of European Bank lending and the role of economic policy uncertainty

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The Heterogeneity of European Bank Lending and the Role of Economic Policy Uncertainty[1]

Daniel PASTOREK – Dajana MAZŮRKOVÁ*

Abstract

   The paper examines the relationship between bank lending activity and economic-policy uncertainty, using data from 1998 to 2018 for 7,844 banks from the European Union (28). Our findings demonstrate a negative impact of European uncertainty on bank lending. Importantly, we observe heterogeneity within the EU. While the impact on Western European countries is statistically significant, this effect has not been confirmed for Central and Eastern European Countries. This heterogeneity is also evident using different model specifications.

Introduction

   The economic crisis revealed the rigidity of the undiversified bank funding model on which European firms, especially small and medium-sized enterprises, rely on. On one side, the bank's capital constraints and deterioration of the quality of their balance sheet assets exacerbate the possibility of bank lending. On the other, the inability to predict the implications of policy changes on the private sector, which tends to happen mostly after a performance downturn (Pástor and Veronesi, 2013), represents a non-diversifiable risk which can intensify this

   * Daniel PASTOREK – Dajana MAZŮRKOVÁ, Mendel University in Brno, Faculty of Business and Economics, Zemědělská 1, 613 00 Brno, Czech Republic; e-mail: daniel.pastorek@mendelu.cz; xmazurko@mendelu.cz

negative effect and economic recovery. This uncertainty about monetary policy, fiscal policy and regulatory policies is referred to by the authors (e.g., Baker et al., 2016; Danisman et al., 2020) as economic policy uncertainty.

In this paper, we focus on European economic policy uncertainty and bank lending activity within Europe, which despite the evidence of negative effects of uncertainty on bank lending has been proposed but is still an under-researched area relative to the other fields of economics. Several studies have used the economic policy uncertainty index (EPU), originally developed by Baker et al. (2016) for the autarkic U.S. policy, to analyse the impact of economic policy uncertainty on bank lending. While the EPU provides a useful measure of economic uncertainty that can be compared across countries and over time, it may not fully capture the institutional and policy differences between European countries and the U.S., including their political structures, economic governance frameworks, and regulatory regimes. Despite the efforts to promote convergence among European members, disparities in their economic and financial sector development and the role of international trade, further complicate the picture. As a result, there is potential for significant heterogeneity in the impact of economic and political uncertainty, which effect may stem primarily from difficulties to predicting economic and political steps in European policies rather than local uncertainty.

To examine this potential heterogeneity in effects of economic policy uncertainty on bank lending in Europe, we analyse behaviour of 7,844 banks in 28 European Union countries covering both Global Financial Crisis and European Debt crisis. As a proxy for the uncertainty, we use the European economic-policy uncertainty index developed by authors Baker et al. (2016). Given the existing research using national economic-policy uncertainty (e.g., Danisman et al., 2020) we expand on not only the period covered but also the number of analysed countries and financial institutions.

Consistent with previous research, the results reveal a negative impact of economic and political uncertainty on bank lending activity in Europe. An interesting finding is differences between the banks located in Western EU countries and Central and Eastern European countries (CEEC). We observe a greater and statistically significant impact of uncertainty in Western countries, while uncertainty does not significantly affect CEEC lending.

To address the stability of our results, we also split the sample between countries that are part of EMU, and thus have their monetary policy conducted by the ECB, and countries with an independent monetary policy. Lastly, we split countries by trade openness, as CEEC countries usually have a larger share of trade openness compared to Western EU countries, due to their smaller internal market. We also test the robustness of our results by employing the global EPU index.

The paper is structured as follows: The next section provides a literature review on economic policy uncertainty and bank lending activity. An overview of data and methods is provided in the third section. Section four presents the uncertainty indices in greater detail, along with the results of regression analyses. Section five presents a robustness analysis. Finally, section six concludes the paper, and the paper ends with an appendix containing additional details on the data.

1. Literature Review

Although the definition of uncertainty in theoretical literature is not uniform, we drew on the definition of economic-policy uncertainty (EPU) as unpredictability and ambiguity of political processes (e.g., Baker et al., 2016; Danisman et al., 2020). The government's policies rule the game in which the private sector operates, and policy uncertainty stems from the heterogeneity of policy alternatives. The unknown implications of newly adopted policies on the economy and private sector represent economic policy uncertainty (Ng et al., 2020). The negative macroeconomic effects of uncertainty shocks represent fertile research in recent years led by Bloom (2009), but the relationship between uncertainty and banking activity flows, especially in Europe, remains an under-researched area relative to the other fields of economics and finance.

The study focuses on uncertainty effects and bank lending suggests a negative effect of the unpredictable and ambiguous policy-making process on bank lending activity (Hu and Gong, 2018; Caglayan and Xu, 2018; Nguyen et al., 2019) through bank lending channels (Bordo et al., 2016; Berget et al., 2019). Financial institutions adjust their credit decision-making strategies quite frequently and in order to reduce their risk exposure, the uncertainty can lead to a moderation in credit growth. Bordo et al. (2016) found that commercial banks are averse to uncertainty and moderate their credit growth and change interest rates in an effort to reduce their risk exposure. However, this effect is milder if banks are better capitalised and diversified. In line with these findings, Hu and Gong (2018) reported that uncertainty can affect bank lending to various degrees depending on bank characteristics and national prudential regulations. The weaker impact of this uncertainty on large and/or well-capitalised financial institutions is highlighted by Nguyen et al. (2019), and Altunbas et al. (2010) suggested that banks may engage in lending activities with higher risk taking due to having stronger market power.

Authors Danisman et al. (2020) examined the effect of EPU on loan growth at European banks, and the results also confirm the negative effect of EPU on credit growth. This negative impact increases with the maturity of the debt and is highest for long-term loans, which represent a larger liability for banks. In addition,

economic-policy uncertainty results in a decline in companies' long-term invest-ment activities, which affects real economic growth. In contrast to Nguyen et al. (2019), Danisman et al. (2020) argued that the adverse effects of EPU on credit growth are stronger for well-capitalised banks. However, the weaker impact of EPU at larger banks with more employees and branches is confirmed by both studies, which is inconsistent with the empirical results of Hu and Gong (2018).

Alessandri and Bottero (2020) investigated the effect of EPU on the supply of credit in Italy using data on subjects' loan applications. They found that rising levels of socio-political uncertainty reduce loan application acceptance rates and delay the flow of financial resources into the economy. Berger and Sedunov (2017) argued that financial institutions hoard liquidity in response to EPU. Banks do so to protect themselves and hold more liquid assets. Barraza and Civelli (2020) focused on the supply of business loans and their empirical results show that an exogenous increase in EPU causes a decline in the supply of business credit due to a decline in the demand for funds. The empirical results of Ashraf and Shen (2019) indicate that in periods of higher economic policy uncertainty, banks' average interest rates include a premium for this uncertainty. That implies that financial institutions charge considerably higher interest rates on loans.

Gozgor et al. (2019) employed the World Uncertainty Index (WUI) and a data sample of 139 countries shows that rising uncertainty leads to a decline in the level of domestic lending. However, there are differences in the effects, with low and middle-income economies experiencing a strong effect, while high-income econo-mies are not affected by lending uncertainty.

Karadima and Louri (2020) found that before the banking union was initiated in euro area countries, these financial institutions had to cope with increasing policy uncertainty. As a result of severe problems, some banks were forced to opt for mergers to increase market concentration. They found that, in a sense, bank concentration compensates for market uncertainty. This may be due to the reduc-tion of asymmetric information and more effective monitoring of bad loans.

In addition to uncertainty, there are other important determinants of bank lend-ing activities, and the literature conventionally considers several bank-specific factors and macroeconomic fundaments. Bank-specific factors include those that can be controlled by the bank itself and literature conventionally suggests the following: capital (Kishan and Opiela, 2000; Gambacorta and Shin, 2016), pro-fitability (Genay and Podjasek, 2014; Borio et al., 2017; Altavilla et al., 2018), risk indicators (Sánchez Serrano, 2020) and liquidity (Kashyap and Stein, 2000; Gambacorta, 2005). Macroeconomic fundaments represent economic conditions that banks cannot fully control but include in their decision-making. The link be-tween macroeconomic shocks, institutional environment and the responses of bank

lending activities to the financial crisis is highlighted by Kapounek (2017). Several types of macroeconomic shocks can affect banks' lending behaviour. These include shocks to domestic monetary policy (Chatelain et al., 2003), the business cycle (Bucher et al., 2013), inflation and the real exchange rate.

2. Data and Methods

We analyse bank-specific data for 7,844 banks from the European Union (28) covering the period from 1998 to 2018 on an annual frequency. Selected micro-economic data was obtained from the Orbis database and macroeconomic data was drawn from the Eurostat database. The data on economic policy uncertainty (European EPU index and Global EPU index) were obtained from its official web-site[2] and converted into annual data using the arithmetic mean.

To identify the impact of selected determinants on bank lending activity we specify the following regression model:

$$loans_{it} = const + \sum_{m=1}^{M} \beta_m banks_{it}{}^m + \sum_{s=1}^{S} \beta_s macro_{ct}{}^s + \gamma EPU_t + \mu_i + \theta_t + \varepsilon_{it} \quad (1)$$

where *i* represents bank, *c* country, and *t* selected year. The explanatory varia-ble represents the lending activity of banks expressed as a ratio of loans to total assets. The first set of variables, denoted by *banks*, represents bank-specific deter-minants. Following the literature review, we include profitability expressed as net interest margin (NIM), liquidity ratio, solvency ratio and capital. Variable capital in our model represents a level of solvency ratio regulation requirement. The second set of variables, detonated by *macro,* represents selected macroeconomic shocks, *s,* suggested by the literature. These include real GDP, inflation (HICP), the real effective exchange rate (REER) and interest rates. For all bank-specific variables, we identify and remove the outliers in the 5% and 95% percentiles, and both data sets were transformed using logs. EPU indices represents the European economic-policy uncertainty index, and global EPU serve as proxy for global uncertainty. Finally, in our panel regression model, we use the OLS estimator including bank fixed effects, μ, time effects, θ and residuals ε.

Table A1 in the appendix contain a detailed description of the variables and expected signs of the variables relative to bank lending activity according to the theory. Table A2 presents descriptive statistics and Table A3 presents a pair-wise correlation matrix.

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[2] <https://www.policyuncertainty.com/>.

3. Results

First, in this section, we provide an overview of the European economic policy uncertainty index and global economic policy uncertainty index in greater detail. Second, we examine its effects on banks' lending activity.

3.1. Economic Policy Uncertainty

The economic policy uncertainty index (EPU) was originally calibrated on the U.S. economy using a component of newspaper coverage of policy-related economic uncertainty resulting from 10 large newspapers. This index is also used for the majority of other country-specific indices. Although indices provide a useful measure of economic uncertainty that can be compared over time and across countries, for the European variant of this index, this calibration is questionable.

F i g u r e 1
European Economic Policy Uncertainty Index (EPU EU)
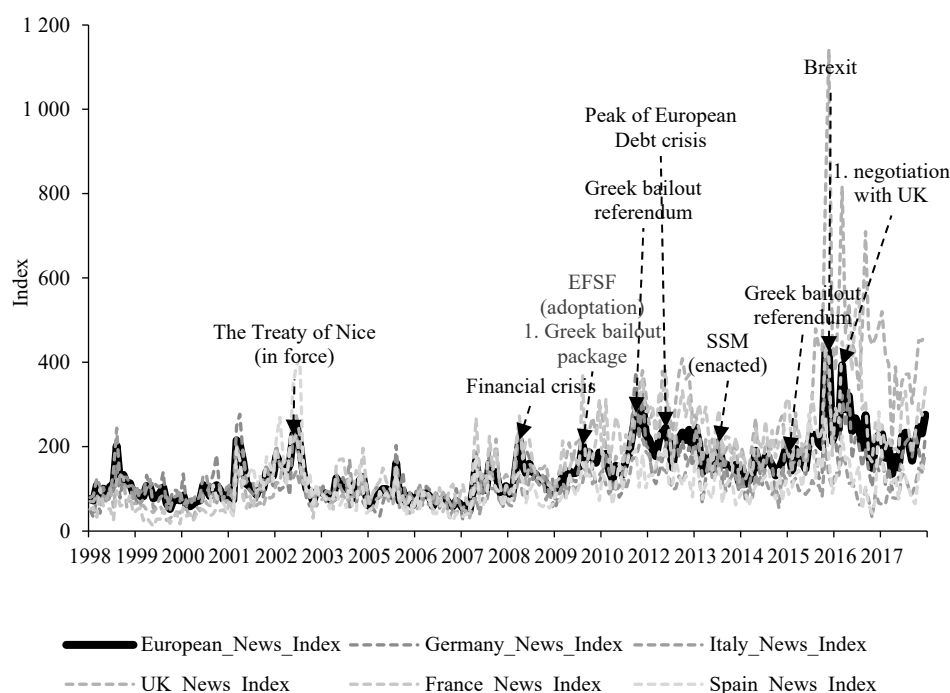
Note: The European news index presents a European EPU variant by Baker et. al. (2016) compiled from 5 selected countries. These are Germany, Italy, the United Kingdom, France, and Spain. The index is at the monthly frequency from 1998:1 to 2018:12 with a mean of 100.
Source: <policyuncertainty.com>.

F i g u r e 2
Global Economic Policy Uncertainty Index (Global EPU)
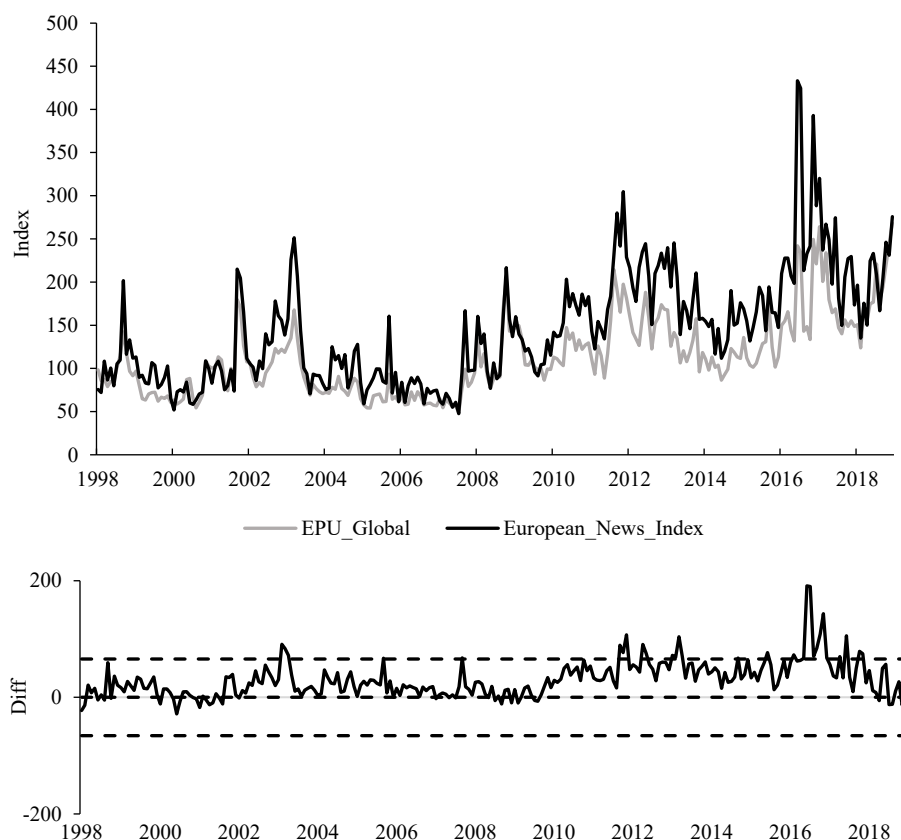
Notes: The Global Economic policy uncertainty index present a global proxy for economic policy uncertainty by Davis (2016) compiled by using the GDP-weighted average of national EPU indices for 21 countries worldwide. The index is at the monthly frequency from 1998:1 to 2018:12 with a mean of 100. The lower figure represents the difference between the European EPU and global EPU indices. The dashed upper and lower bands represent the value of one standard deviation of the European EPU index to visualize the case when the indices differ by more than a standard deviation.

Source: <policyuncertainty.com>; own calculations.

First, the European EPU by Baker et al. (2016) presented in Figure 1 is based on the five constantly largest EU economies – Germany, the United Kingdom, Italy, Spain, and France. The construction of the European variant is the average of country-specific economic policy uncertainty, which naturally differs among members. Second, the advancing process of European integration represents another layer of the political structure, whose policies interfere with states' policies and can create economic and political uncertainty. Although there is little research on the economic effects of political uncertainty stemming from the EU, Azqueta-Gavaldón et al. (2023) also raise the issue of a particular policy difference between

the European Union and the US in the context of economic and political uncertainty. The authors also confirm that certain types of uncertainty affect investment in some countries more than others. However, one would expect that especially financial institutions that are regulated by the ECB's monetary policy to be more responsive to uncertainty at the European Union level than to domestic levels of uncertainty.

Figure 1 shows that the index corresponds to several European events, with the highest peaks occurring during the European debt crisis and Brexit. In Figure 2, we observe the difference between the index and the global uncertainty index by Davis (2016), which serve as a proxy for global economic policy uncertainty. Overall, the European index reaches higher values compared to the global uncertainty index, with the most significant discrepancies being during the European debt crisis and Brexit. These differences imply that uncertainty at the European level has an impact on economic policy uncertainty at the country level.

3.2. Economic-policy Uncertainty and Bank Lending Activity

The aim of this section is to examine determinants of banks' lending activity and assess the impact of economic and political uncertainty. First, in Table 1 we employ only bank-specific determinants. It turns out that in all model specifications these variables remain stable and significant regardless of whether variables are added sequentially or simultaneously.

T a b l e 1

Bank-specific Determinants and Bank Lending Activity

Variables	Dependent variable: Bank Lending Activity (loans/total assets)				
	(1)	(2)	(3)	(4)	(5)
Profitability	0.132***				0.108***
	(0.013)				(0.013)
Liquidity		–0.121***			–0.068***
		(0.005)			(0.004)
Capital			–0.110***		–0.215***
			(0.015)		(0.015)
Solvency				0.039***	0.260***
				(0.014)	(0.015)
Constant	–0.061***	–0.088***	–0.178***	–0.004	–0.104***
	(0.007)	(0.007)	(0.028)	(0.013)	(0.026)
Yearly dummies	YES	YES	YES	YES	YES
Observations	57,106	56,577	27,726	57,998	25,010
Number of banks	6,738	6,749	5,072	6,847	4,761
R^2	0.031	0.086	0.047	0.005	0.277

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables on the bank lending activity including fixed effects and time effects. The regressions were estimated for the sample of 28 European member countries over the years 1998 to 2018. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

The expected positive impact of the bank's performance on banking activity, jointly with solvency, was confirmed. In cases of higher profitability, the bank can increase its lending capacity and thus contribute to the generation of interest income. Conversely, an increase in liquidity or capital reduces the lending activity of financial institutions. Liquidity is linked to the stability of the bank and is necessary for the smooth running of the institution. However, if a financial institution is faced with too much liquidity, it limits the funds available to generate new loans. Stability is also related to capital tightening regulatory policy.

The results in Table 2 consist of all variables including bank-specific, macroeconomic variables and economic policy uncertainty. GDP undoubtedly influences the environment in which economic agents operate. When the economy grows, it is not only the demand for bank loans that increases. GDP can be seen as a demand factor for the lending behaviour of financial institutions and has a statistically significant positive effect in all models. At the same time, the phase of the economic cycle impacts the quality of the loan portfolio, which further affects the bank's lending activity (e.g., Kapounek et al., 2017). Although not every included variable among the macroeconomic factors is statistically significant for each model, it meets the expected mark, and the final model confirms its statistical significance. Rising inflation is stimulating more bank lending and the negative REER effect is related to an economic theory suggesting that domestic currency depreciation increases bank lending activity. The expected negative relation of interest rates on the dependent variable was not confirmed. The positive sign may be due to the fact that the period under study was when central banks cut interest rates rapidly in response to a financial crisis and kept them low for long period. During this period, the expansionary monetary policy had an impact on banks' performance and banks increased their interest margins because they perceived a huge risk of lending money.

Importantly, the model confirmed that uncertainty about the future actions of the government and the central bank has a significant negative impact on the lending behaviour of banks in the European Union. The political implications of decisions are unpredictable and therefore the level of costs for businesses is highly uncertain. Financial institutions are forced to reassess their expectations of future policy changes as a result of the constant flow of political news. Frequent changes in fiscal, regulatory and monetary policy areas can threaten the stability of the banking sector. Banks provide loans several years in advance and therefore face adjustment problems in the event of changes in monetary policy. If economic and political uncertainty in the economy increases, this has a negative effect on bank lending, as banks have to adapt but maintain their prudential approach.

The final model confirms with statistical significance of all independent variables included in the model. This means that bank lending activity is significantly influenced by both bank-specific deterministic variables and macroeconomic fundamentals, but also economic and political uncertainty. To validate our results, we provide two additional tests. First, we run a sensitivity test of our baseline model specification presented in Table 2, by introducing one lag for variables profitability and solvency to avoid the potential problem of reverse causality.

T a b l e 2
Economic-policy Uncertainty and Bank Lending Activity

	Dependent variable: Bank Lending Activity (loans/total assets)					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Profitability	0.104***	0.091***	0.098***	0.105***	0.104***	0.089***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)
Liquidity	–0.068***	–0.066***	–0.066***	–0.068***	–0.068***	–0.063***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Capital	–0.205***	–0.200***	–0.203***	–0.201***	–0.205***	–0.194***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Solvency	0.242***	0.239***	0.238***	0.244***	0.242***	0.240***
	(0.016)	(0.016)	(0.015)	(0.016)	(0.016)	(0.016)
GDP	0.360***	0.404***	0.415***	0.382***	0.360***	0.491***
	(0.054)	(0.075)	(0.069)	(0.062)	(0.054)	(0.076)
HICP		0.310*				0.799**
		(0.183)				(0.324)
REER			0.066			–0.183
			(0.144)			(0.227)
Interest Rates				0.008		0.019***
				(0.005)		(0.006)
EPU					–0.230***	–0.622***
					(0.079)	(0.209)
Constant	0.180***	0.276***	0.205***	0.139**	1.256***	3.307***
	(0.047)	(0.071)	(0.051)	(0.057)	(0.417)	(1.097)
Yearly dummies	YES	YES	YES	YES	YES	YES
Observations	25,010	23,665	24,387	24,596	25,010	22,915
Number of banks	4,761	4,710	4,724	4,731	4,761	4,658
R^2	0.296	0.291	0.286	0.291	0.296	0.294

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macroeconomic shocks, and economic policy uncertainty on the bank lending activity including fixed effects, and time effects. The regressions were estimated for the sample of 28 European member countries over the years 1998 to 2018. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

The results remain stable and are available in the appendix, Table A4. Secondly, since we analyse a large number of financial institutions over a long period, our panel dataset is not balanced. We cannot exclude, that some banks may leave the market as a result of high uncertainty. Thus, we rerun our model specification on a strongly balanced panel. Results are available in the appendix, Table A5. In the final model specification, EPU as a proxy for uncertainty has a negative sign but with no statistical significance. The significance may be affected by dropped

observations due to data balancing and proposed heterogeneity. Thus, we conduct additional analyses in the following exercises to examine potentially more profound relationships.

Next, we categorize banks by location. The first group of countries represent financial institutions that are located in Western countries of the European Union, and the second group will consist of financial institutions operating in CEEC. The results of the regressions are available in Table 3. Since analysis is performed over a 20year period, it allows us to examine the different monetary policy frameworks, especially focusing on the period of relatively low interest rates in greater detail. To do so, we divide our dataset into two sub-periods: one before and one after 2011. This split also covers the periods before and after the European debt crisis and Brexit, during which the uncertainty index increased significantly.

We do this exercise because, despite the fact that most of Central and Eastern Europe have made significant progress in recent years in terms of economic development and integration into the world economy, there are still significant economic disparities between Western and CEEC. In addition to macroeconomic variables, differences are also in the form of bank concentration and funding. For example, in Western Europe, a smaller number of banks control a larger share of the market, and their sources of bank funding rely more on market-based sources compared to banks in CEEC, where traditional banking is more prevalent. Moreover, despite the common integration process in the EU, the benefits and costs of integration may not always be equally distributed among its members. These distinctions, among others, may cause different responses to the proxy for economic policy uncertainty, which is measured by the EPU index.

The results show that bank-specific determinants have a statistically significant and stable impact on bank lending activity for both groups of countries. On the contrary, we can see the different impacts of macroeconomic shocks on the two groups of countries. The reaction to macroeconomic fundamentals depends on various factors, such as the structure of the economy, the degree of openness to international trade, and the extent of foreign ownership of banks. CEEC countries generally have a strong focus on exports and tend to export to larger foreign markets in Western Europe due to their small internal market. Additionally, the scarcity of domestic savings and interest rate differentials between domestic and foreign currency loans may impact bank lending activity in these countries. The crucial point of the analysis is the impact of economic-policy uncertainty. The results confirmed the proposed heterogeneity in effects, with a much stronger negative effect of uncertainty (EPU EU) observed for banks located in the Western EU, while a statistically insignificant effect is observed for banks operating in CEEC.

T a b l e 3

European EPU and Bank Lending Activity – Western and CEEC

	Dependent variable: Bank Lending Activity (loans/total assets)					
	CEEC			**WEST**		
Variables	*Whole period*	*Before 2011*	*After 2011*	*Whole period*	*Before 2011*	*After 2011*
Profitability	0.179***	0.042	0.165***	0.077***	0.018	0.091***
	(0.056)	(0.056)	(0.058)	(0.013)	(0.017)	(0.016)
Liquidity	–0.135***	–0.101***	–0.124***	–0.058***	–0.069***	–0.052***
	(0.019)	(0.031)	(0.020)	(0.004)	(0.005)	(0.004)
Capital	–0.300***	–0.275***	–0.316***	–0.184***	–0.167***	–0.199***
	(0.059)	(0.069)	(0.057)	(0.014)	(0.024)	(0.018)
Solvency	0.321***	0.340***	0.269***	0.233***	0.209***	0.287***
	(0.061)	(0.088)	(0.069)	(0.016)	(0.029)	(0.021)
GDP	0.336	–0.010	–0.400	0.609***	0.301	0.765***
	(0.227)	(0.215)	(0.495)	(0.088)	(0.224)	(0.184)
HICP	–1.109	–1.585	–0.816	1.904***	1.083	1.085**
	(1.019)	(1.543)	(1.638)	(0.522)	(0.731)	(0.503)
REER	–0.457	–0.626	0.944*	–0.627*	1.803***	–1.177***
	(0.394)	(0.388)	(0.502)	(0.366)	(0.638)	(0.318)
Interest rates	0.023***	0.008	–0.003	0.033**	0.022	–0.021
	(0.008)	(0.017)	(0.016)	(0.015)	(0.017)	(0.029)
EPU (EU)	1.162	2.812	3.217	–1.233***	–0.478	–5.104***
	(0.961)	(1.791)	(3.127)	(0.287)	(0.512)	(1.949)
Constant	–6.194	–14.522	–17.028	6.517***	2.580	27.093***
	(5.071)	(9.300)	(16.561)	(1.497)	(2.679)	(10.290)
Yearly dummies	YES	YES	YES	YES	YES	YES
Observations	1,319	262	1,057	21,596	7,733	13,863
Number of banks	311	104	300	4,347	2,262	4,172
R^2	0.485	0.626	0.404	0.285	0.265	0.356

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macro-economic shocks, and European economic policy uncertainty on the bank lending activity including fixed effects, and time effects. The regressions were estimated for the sample of 17 of 28 European member countries, classi-fied as WEST and the rest of the sample of 11 of 28 European member countries are classified as CEEC. The annual data represent the period from 1998 to 2018. For more detail, different subperiod before and after 2011 are included. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

4. Robustness Analysis

Finally, we perform several robustness analyses in order to address the stability of our results and provide more detailed verification of the findings in the empiri-cal part. In the first exercise, we replicate the analysis presented in Table 3, where we categorize countries based on their location as either Western or CEEC. The difference between this exercise and the previous one is the use of global EPU as a proxy for global uncertainty, as presented in Figure 2. The results are available in Table 4. Secondly, we split countries into those that are part of EMU and have their monetary policy conducted by the ECB, and countries with an independent monetary policy. In these classifications, we apriori employ both European and

global uncertainty. The results are available in Table 5. Lastly, we control for trade openness, as CEEC countries typically have a larger share of trade openness compared to Western EU countries due to their small internal markets. The results of this exercise are available in Table 6.

Using the global proxy for the uncertainty in Table 4 confirmed the effects found in the main analysis, although the effect size is smaller compared to European uncertainty.

T a b l e 4

Global EPU and Bank Lending Activity – Western and CEEC

	Dependent variable: Bank Lending Activity (loans/total assets)					
	CEEC			**WEST**		
Variables	*Whole period*	*Before 2011*	*After 2011*	*Whole period*	*Before 2011*	*After 2011*
Profitability	0.179***	0.042	0.165***	0.077***	0.018	0.091***
	(0.056)	(0.056)	(0.058)	(0.013)	(0.017)	(0.016)
Liquidity	–0.135***	–0.101***	–0.124***	–0.058***	–0.069***	–0.052***
	(0.019)	(0.031)	(0.020)	(0.004)	(0.005)	(0.004)
Capital	–0.300***	–0.275***	–0.316***	–0.184***	–0.167***	–0.199***
	(0.059)	(0.069)	(0.057)	(0.014)	(0.024)	(0.018)
Solvency	0.321***	0.340***	0.269***	0.233***	0.209***	0.287***
	(0.061)	(0.088)	(0.069)	(0.016)	(0.029)	(0.021)
GDP	0.336	–0.010	–0.400	0.609***	0.301	0.765***
	(0.227)	(0.215)	(0.495)	(0.088)	(0.224)	(0.184)
HICP	–1.109	–1.585	–0.816	1.904***	1.083	1.085**
	(1.019)	(1.543)	(1.638)	(0.522)	(0.731)	(0.503)
REER	–0.457	–0.626	0.944*	–0.627*	1.803***	–1.177***
	(0.394)	(0.388)	(0.502)	(0.366)	(0.638)	(0.318)
Interest rates	0.023***	0.008	–0.003	0.033**	0.022	–0.021
	(0.008)	(0.017)	(0.016)	(0.015)	(0.017)	(0.029)
EPU (Global)	0.878	3.852	0.586	–1.197***	–0.908	–0.930***
	(0.726)	(2.454)	(0.570)	(0.279)	(0.974)	(0.355)
Constant	–4.616	–18.698	–2.994	6.236***	4.510	4.823***
	(3.767)	(11.961)	(2.918)	(1.432)	(4.750)	(1.785)
Yearly dummies	YES	YES	YES	YES	YES	YES
Observations	1,319	262	1,057	21,596	7,733	13,863
Number of banks	311	104	300	4,347	2,262	4,172
R^2	0.485	0.626	0.404	0.285	0.265	0.356

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macroeconomic shocks, and global economic policy uncertainty on the bank lending activity including fixed effects and time effects. The regressions were estimated for the sample of 17 of 28 European member countries, classified as WEST and the rest of sample of 11 of 28 European member countries are classified as CEEC. The annual data represent the period from 1998 to 2018. For more detail, different subperiod before and after 2011 are included. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

Similarly, a slightly lower effect was also confirmed in classification by countries using the euro and non-euro area members. Notably, a difference was observed in the classification by countries with trade openness below and above 100, when the effect of global uncertainty on countries with a relatively smaller share

of foreign trade was not found, while the impact of European uncertainty remained significant. Overall, a significant effect of uncertainty was observed for Western countries, countries with the euro, and countries with a relatively smaller share of foreign trade. In contrast, we observe a non-significant effect for CEECs, countries without the Euro and countries with a relatively larger share of foreign trade. Although these are different classifications, the results are not surprising since CEECs, with exceptions, mostly consist of countries that have not implemented the common currency and typically have a larger share of trade openness compared to Western EU countries. Importantly, the analyses show that the results remain robust and highlight the heterogeneity of economic policy uncertainty as measured by the EPU indices.

T a b l e 5

EPU and Bank Lending Activity – EA and Non-EA Countries

	Dependent variable: Bank Lending Activity (loans/total assets)			
Variables	Non-EA		EA	
Profitability	0.197***	0.197***	0.051***	0.051***
	(0.041)	(0.041)	(0.014)	(0.014)
Liquidity	–0.100***	–0.100***	–0.055***	–0.055***
	(0.019)	(0.019)	(0.003)	(0.003)
Capital	–0.137***	–0.137***	–0.192***	–0.192***
	(0.051)	(0.051)	(0.014)	(0.014)
Solvency	0.146**	0.146**	0.260***	0.260***
	(0.065)	(0.065)	(0.017)	(0.017)
GDP	0.569**	0.569**	0.725***	0.725***
	(0.225)	(0.225)	(0.093)	(0.093)
HICP	–0.158	–0.158	2.203**	2.203**
	(0.514)	(0.514)	(0.921)	(0.921)
REER	–0.574*	–0.574*	–0.890	–0.890
	(0.339)	(0.339)	(0.804)	(0.804)
Interest rates	0.006	0.006	0.003	0.003
	(0.008)	(0.008)	(0.100)	(0.100)
EPU (EU)	–0.619		–1.504**	
	(0.473)		(0.662)	
EPU (Global)		–0.654		–1.460**
		(0.500)		(0.643)
Constant	3.270	3.407	8.105**	7.761**
	(2.490)	(2.595)	(3.491)	(3.340)
Yearly dummies	YES	YES	YES	YES
Observations	1,721	1,721	20,094	20,094
Number of banks	459	459	4,102	4,102
R^2	0.308	0.308	0.314	0.314

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macroeconomic shocks, and global/European economic policy uncertainty on the bank lending activity including fixed effects and time effects. The regressions were estimated for the sample of 28 European member countries, classified by countries according to whether they have adopted the euro with respect to the adaptation time. The annual data represent the period from 1998 to 2018. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

T a b l e 6

EPU and Bank Lending Activity – The Role of Trade Openness

Variables	Dependent variable: Bank Lending Activity (loans/total assets)			
	Openness > 100		Openness < 100	
Profitability	0.187*** (0.042)	0.187*** (0.042)	0.055*** (0.013)	0.055*** (0.013)
Liquidity	–0.124*** (0.013)	–0.124*** (0.013)	–0.051*** (0.003)	–0.051*** (0.003)
Capital	–0.245*** (0.038)	–0.245*** (0.038)	–0.173*** (0.014)	–0.173*** (0.014)
Solvency	0.185*** (0.038)	0.185*** (0.038)	0.252*** (0.017)	0.252*** (0.017)
GDP	–0.012 (0.184)	–0.012 (0.184)	0.791*** (0.075)	0.791*** (0.075)
HICP	0.398 (0.599)	0.398 (0.599)	2.514*** (0.419)	2.514*** (0.419)
REER	0.045 (0.363)	0.045 (0.363)	–0.961*** (0.310)	–0.961*** (0.310)
Interest rates	0.019*** (0.006)	0.019*** (0.006)	–0.011 (0.022)	–0.011 (0.022)
EPU (EU)	0.339 (0.322)		–1.680*** (0.199)	
EPU (Global)		0.002 (0.002)		–0.012*** (0.001)
Constant	–1.842 (1.694)	–0.488 (0.407)	9.113*** (1.052)	2.395*** (0.258)
Yearly dummies	YES	YES	YES	YES
Observations	2,916	2,916	19,770	19,770
Number of banks	602	602	3,960	3,960
R^2	0.372	0.372	0.322	0.322

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macroeconomic shocks, and global/European economic policy uncertainty on the bank lending activity including fixed effects and time effects. The regressions were estimated for the sample of 28 European member countries, classified according to the level of trade openness with a level above and below 100. The annual data represent the period from 1998 to 2018. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

Conclusions

We focus on the effects of European economic policy uncertainty on bank lending activity in Europe over the period 1998 to 2018. We contribute to the stream of this literature by classifying financial institutions not only according to their location, but also monetary policy stance, and the role of international trade. These exercises are done by including different sub-periods, and we employ both European and global economic policy uncertainty proxy. Given the current research we expand not only the period covered but also the number of analysed countries and financial institutions.

Our results show the expected negative effects of economic-policy uncertainty on bank-lending activity in European Union countries. However, the effect of uncertainty is not homogenous across European Union countries. We found that

the effect of uncertainty measured by EPU indices on Western EU countries and banks operating in CEECs varies. We observe a stronger and statistically significant negative impact of uncertainty in Western countries compared to CEECs. These results remain robust when using different classifications and sub-periods. When we employ a global EPU index instead of a European EPU, the results do not change significantly, although the measured effect is slightly smaller for the global uncertainty proxy. Although some correlation is expected between global and European uncertainty, the largest differences are observed during policy-related events that are unique to EU-countries. These differences imply that uncertainty related to the project of European integration has an impact on economic policy uncertainty at the country level, and that the negative impact of uncertainty on bank lending may be particularly associated with difficulty of predicting economic and political actions in the European Union, rather than by local uncertainty. These findings provide more detailed information about what drives international banking flows, which is of central importance for policymakers and economists trying to understand the transmission of a banking crisis. However, they also highlight the need for closer examination of the impact of uncertainty that arise not from economic-political uncertainty measured at the country level, but from the uncertainty stemming from the common integration process in the case of European countries.

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A p p e n d i x

T a b l e A1

Variable Descriptions

Variables	Description	Source of data	Expected sign
Lending activity	Dependent variable (Loans/Total assets)	ORBIS	
Profitability	Net Interest Margin	ORBIS	+
Liquidity	Current Assets/Current Liabilities	ORBIS	−
Capital	Solvency ratio regulation requirement	ORBIS	−
Solvency	Equity/Total Assets	ORBIS	+
GDP	Real domestic product	Eurostat	+
HICP	Harmonised index of consumer prices (index)	Eurostat	+
REER	Real effective exchange rate (index)	Eurostat	−
Interest rate	Three-month interbank interest rate	Eurostat	−
EPU (EU)	European economic policy uncertainty index	policyuncertainty.com	−
EPU (Global)	Global economic policy uncertainty index	policyuncertainty.com	−

Source: Authors' estimation.

T a b l e A2

Descriptive Statistics

Variables	Obs.	Mean	St. Dev.	Min	Mdn.	Max
Lending activity	68 054	55.84	22.82	−1.86	59.94	100.00
Profitability	69 785	2.61	15.23	−900.00	2.35	947.67
Liquidity	67 372	34.24	68.79	0.00	17.48	997.63
Capital	32 427	19.97	21.13	−101.38	16.30	866.00
Solvency	70 819	12.28	17.60	−749.66	7.86	138.02
GDP	115 451	1.50E+06	9.70E+05	3582	1.60E+06	3.40E+06
HICP	115 451	88.84	10.22	13.19	91.00	108.05
REER	115 451	100.60	7.57	52.73	100.00	140.12
Interest rate	113 354	2.21	2.09	−0.70	2.11	19.91
EPU (EU)	115 451	144.32	52.09	74.19	129.61	277.67
EPU (Global)	115 451	113.48	34.76	62.68	110.88	189.65
Lending activity ln	61 248	−0.07	0.46	−2.20	0.06	0.49
Profitability ln	62 803	−0.06	0.67	−3.80	0.16	0.75
Liquidity ln	60 634	−0.47	0.71	−2.37	−0.43	1.06
Capital ln	29 181	−0.26	0.29	−0.83	−0.28	0.49
Solvency ln	63 737	−0.47	0.52	−1.63	−0.51	1.14
GDP ln	115 451	−0.25	0.29	−1.71	−0.13	0.41
HICP ln	103 596	−0.12	0.10	−0.32	−0.09	0.02
REER ln	103 861	0.01	0.03	−0.13	0.01	0.07
EPU ln	115 451	4.91	0.36	4.31	4.86	5.63
EPU (Global) ln	115 451	4.68	0.32	4.14	4.71	5.25

Source: Own calculations based on dataset.

T a b l e A3

Matrix of a Pair-Wise Correlation between Variables

Variables	Lending activity	Profitability	Liquidity	Capital	Solvency	GDP	HICP	REER	Interest rate	EPU	EPI (Global)
Lending activity	1.000										
Profitability	0.017	1.000									
Liquidity	–0.428	0.009	1.000								
Capital	–0.235	0.010	0.236	1.000							
Solvency	–0.251	0.066	0.362	0.479	1.000						
GDP	0.052	0.004	–0.094	–0.076	–0.059	1.000					
HICP	0.045	–0.029	–0.032	0.039	0.025	0.177	1.000				
REER	–0.027	0.017	0.039	0.021	0.084	0.232	–0.008	1.000			
Interest rate	–0.014	0.024	0.036	–0.073	–0.018	–0.135	–0.777	0.076	1.000		
EPU (EU)	–0.002	–0.016	–0.009	0.070	0.050	0.066	0.731	–0.045	–0.655	1.000	
EPU (Global)	–0.001	–0.016	–0.008	0.063	0.045	0.061	0.701	–0.039	–0.575	0.941	1.000

Source: Own calculations based on dataset.

T a b l e A4

Sensitivity Test of Baseline Model Specification to Lagged Variables

Variables	Dependent variable: Bank Lending Activity (loans/total assets)					
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability (t-1)	0.080***	0.062***	0.076***	0.080***	0.080***	0.056***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)
Liquidity	−0.077***	−0.073***	−0.072***	−0.076***	−0.077***	−0.069***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Capital	−0.132***	−0.128***	−0.129***	−0.129***	−0.132***	−0.123***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.014)
Solvency (t-1)	0.147***	0.144***	0.139***	0.147***	0.147***	0.148***
	(0.015)	(0.017)	(0.015)	(0.016)	(0.015)	(0.016)
GDP	0.399***	0.489***	0.493***	0.427***	0.399***	0.598***
	(0.060)	(0.082)	(0.081)	(0.068)	(0.060)	(0.088)
HICP		0.084				0.393
		(0.212)				(0.356)
REER			−0.159			−0.108
			(0.161)			(0.258)
Interest Rates				0.009		0.023***
				(0.008)		(0.008)
EPU					−0.247***	−0.482***
					(0.071)	(0.179)
Constant	0.199***	0.259***	0.267***	0.166**	1.312***	2.524***
	(0.054)	(0.084)	(0.061)	(0.069)	(0.372)	(0.934)
Yearly dummies	YES	YES	YES	YES	YES	YES
Observations	22,225	20,956	21,729	21,856	22,225	20,303
Number of banks	4,675	4,614	4,641	4,645	4,675	4,562
R^2	0.211	0.201	0.199	0.203	0.211	0.204

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macro-economic shocks, and economic policy uncertainty on the bank lending activity including fixed effects, and time effects. The regressions were estimated for the sample of 28 European member countries over the years 1998 to 2018 including one lag to selected bank-specific variables. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.

T a b l e A5

Baseline Model Specification Using a Strongly Balanced Dataset

Variables	Dependent variable: Bank Lending Activity (loans/total assets)					
	(1)	(2)	(3)	(4)	(5)	(6)
Profitability	0.052***	0.057***	0.057***	0.049***	0.052***	0.056***
	(0.015)	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)
Liquidity	–0.057***	–0.056***	–0.056***	–0.056***	–0.057***	–0.055***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Capital	–0.168***	–0.166***	–0.167***	–0.169***	–0.168***	–0.168***
	(0.018)	(0.018)	(0.017)	(0.018)	(0.018)	(0.017)
Solvency	0.229***	0.219***	0.216***	0.230***	0.229***	0.213***
	(0.018)	(0.018)	(0.019)	(0.018)	(0.018)	(0.018)
GDP	0.848***	0.743***	0.858***	0.850***	0.848***	0.818***
	(0.086)	(0.095)	(0.091)	(0.086)	(0.086)	(0.102)
HICP		–1.319***				–0.757
		(0.382)				(0.497)
REER			–0.587***			–0.363*
			(0.191)			(0.215)
Interest Rates				0.010*		0.013**
				(0.006)		(0.006)
EPU					–0.211***	–0.047
					(0.012)	(0.103)
Constant	0.070***	–0.025	0.082***	0.056***	1.077***	0.232
	(0.006)	(0.029)	(0.007)	(0.011)	(0.064)	(0.531)
Yearly dummies	YES	YES	YES	YES	YES	YES
Observations	12,602	12,602	12,571	12,590	12,602	12,559
Number of banks	3,984	3,984	3,978	3,983	3,984	3,977
R^2	0.336	0.341	0.344	0.338	0.336	0.347

Notes: The reported coefficients were obtained from an OLS panel regression of bank-specific variables, macro-economic shocks, and economic policy uncertainty on the bank lending activity including fixed effects, and time effects. The regressions were estimated for the sample of 28 European member countries over the years 1998 to 2018 using a balanced dataset. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level.

Source: Own calculations based on dataset.