Finance Research Letters 29 (2019) 373–378

Contents lists available at ScienceDirect

Finance Research Letters

journal homepage: www.elsevier.com/locate/frl

Economic policy uncertainty, prudential regulation and bank lending☆

Shiwei Hu[a], Di Gong[b,*]

[a] International Business School, Beijing Foreign Studies University, Beijing, China
[b] School of Banking and Finance, University of International Business and Economics, Beijing 100029, China

ARTICLE INFO

Keywords:
Economic policy uncertainty
Prudential regulation
Macroprudential policies
Bank lending

JEL Classification:
G18
G21

ABSTRACT

This paper empirically tests the theories concerning bank lending, economic policy uncertainty (EPU), and national prudential regulations. Using bank level data in 19 major economies, we find that EPU significantly hinders the growth of bank credit, but the effect varies across banks. In particular, the negative effect of EPU on loan growth is greater for larger-sized banks and riskier banks, while weaker for more liquid banks and more diversified banks. In addition, the impact of EPU on bank lending depends critically on national prudential regulations, such that the negative effect appears to be alleviated by both macroprudential and microprudential policies.

1. Introduction

Uncertainty related to economic policy may affect the real economy as firms tend to decrease investment and cut jobs amid periods of high uncertainty, while households tend to reduce consumption (Baker et al., 2016; Gulen and Ion, 2016). Recent studies focus on a bank lending channel through which economic policy uncertainty (EPU) slows US credit growth and eventually harms the economy (Bordo et al., 2016; He and Niu, 2018; Berger et al., 2018). Bordo et al. (2016) emphasize that elevated EPU levels during financial crises and recessions might further restrain bank credit and thereby slow down the recovery. Extending existing research of US banks to an international setting, we investigate the impact of EPU on bank lending in 19 major economies. Importantly, this cross-country setting allows us to examine how the EPU effect depends on national prudential regulation, which has not been studied to date.

Banks are sensitive and averse to uncertainty (Gissler et al., 2016). In reaction to EPU, banks may reduce credit growth to lower risk exposure (Bordo et al., 2016). Accordingly, we find strong evidence for a significantly negative relationship between EPU and bank credit growth, controlling for a large set of bank and macroeconomic covariates, and bank fixed effects. The impact is also economically sizable. In addition, tests on the heterogeneous effects across banks show greater impacts of EPU on larger banks and more risky banks, but smaller effects for more liquid banks and banks with better diversification.

Aimed to reduce systemic risk and the risk of individual distress, macroprudential and microprudential policies are empirically effective in curbing credit growth and improving the financial-system stability and resilience (Galati and Moessner, 2018). Successful prudential regulations hence increase banks' confidence in financial stability and weaken their sensitivity toward uncertainty. Consequently, sound prudential policies might mitigate the negative influence of EPU on bank lending. Having interacted EPU with

☆ We are grateful to the Chief Editor (Narjess Boubakri) and an anonymous referee whose comments improved the quality of this research. We thank Yi David Wang for valuable comments and suggestions. The usual disclaimer applies.

* Corresponding author.
E-mail address: d.gong@uibe.edu.cn (D. Gong).

https://doi.org/10.1016/j.frl.2018.09.004
Received 3 June 2018; Received in revised form 31 August 2018; Accepted 8 September 2018
Available online 10 September 2018
1544-6123/

prudential regulation, we confirm empirically that prudential regulation indeed reduces the impact of EPU on bank lending. This empirical result suggests that sound prudential policies help stabilize bank credit when uncertainty rises.

Our contributions to the literature are twofold. First, our paper adds to the growing literature on the bank lending channel of EPU. For example, Berger et al. (2018) find that EPU decreases liquidity creation in the US banking sector, stemming primarily from decreased supply of banking services. Bordo et al. (2016) present evidence at the aggregate and bank levels that EPU restrains US bank lending. Unlike the prior studies exploiting US time series of EPU, we offer international evidence for the credit restraining effect of EPU on bank lending with extensive, cross-sectional variations in EPU. In addition, we show how the effect depends on bank characteristics, supplementing the discussion in Bordo et al. (2016). Second, unlike most literature (for instance, Bruno et al., 2017; Cerutti et al., 2017; Akinci and Olmstead-Rumsey, 2018) emphasizing the role of macroprudential regulation in curbing fast credit growth and safeguarding financial stability, this paper is the first to shed light on the stabilizing effect of both macroprudential and microprudential regulations on bank lending amid uncertainty. In particular, such stabilizing impact from prudential regulations is likely unintended by policy makers but arguably a desirable side-effect when combating uncertainty.

The rest of the paper is organized as follows. Section 2 presents the data and empirical methods. Section 3 analyses the results. Section 4 concludes and discusses policy implications.

2. Data

To identify the impact of EPU on bank lending, we estimate the following model:

$$\text{Lending}_{i,j,t} = \alpha_i + \beta_t + \gamma \text{EPU}_{j,t-1} + \text{Bank control}_{i,t-1} + \text{Macro}_{j,t} + \varepsilon_{i,j,t} \quad (1)$$

where *i,j,t* represents bank, country, and year, respectively. Our dependent variable, $\text{Lending}_{i,j,\ t}$, is the growth rate of net loans. For the variable of interest, we adopt the monthly, continuous index of economic policy uncertainty compiled by Baker et al. (2016). It is a country-specific index constructed based on newspaper coverage frequency, number of federal tax code provisions set to expire in future years, and disagreement among economic forecasters. Reflecting the movements in policy-related uncertainty, EPU is available for 19 major economies of both developed countries and emerging markets.[1] Baker et al. (2016) show a strong relationship between EPU index and other conventional measures of economic uncertainty and policy uncertainty. This index has been widely applied in academic research, industry practice, congressional testimony and central bank speeches.[2] Fig. 1 plots the trends of economic policy uncertainty for each country in our sample in the period from 2005 to 2011. Note that EPU indices tend to co-move over time. Moreover, several sharp spikes in our sample period correspond to events such as the global finance crisis and European sovereign debt crisis. Following Berger et al. (2018), we use the average of monthly EPU index in the natural logarithm form.

All bank data come from Bankscope. To separate the impact of EPU from other confounding factors, we control for a set of bank-specific covariates, including bank size (logarithm of total assets), capitalization (equity/total assets), profitability (ROA), and credit risk (LLP, defined as loan loss provisions/net interest income). All bank-specific variables are winsorized at the 1% and 99% levels to reduce the effect of outliers. We lag EPU and bank level controls one period to mitigate potential reverse-causality concerns.

Moreover, we include a set of country-specific controls from the World Development Indicators (WDI) to account for country heterogeneity, including growth rates of real GDP, inflation rate, credit to private sector over GDP (Credit), and stock capitalization over GDP (Stock cap). In addition, to capture the market structure of the banking sector, we employ asset-based HHI constructed from Bankscope. In sum, the set of country covariates are expected to control for local market macroeconomic circumstances to partially account for demand effects.

Throughout all specifications, we include bank fixed effects, α_i, and year fixed effects, β_t, to absorb any unobserved, time-invariant bank heterogeneity and business cycle effects, respectively. We employ robust standard errors clustered at the bank level, which are reported in parentheses below the coefficient estimates. We estimate all models using bank fixed effects panel regression.

To gauge whether the impact of EPU on bank lending depends on bank heterogeneity, we consider four characteristics, including bank size, risk, NSFR (net stable funding ration in the Basel III), and asset diversification (difference between net loans and other earning assets divided by the sum of the two, see Laeven and Levine, 2007). We therefore estimate the following model, where $X_{i,t-1}$ stands for bank heterogeneity:

$$\text{Lending}_{i,j,t} = \alpha_i + \beta_t + \gamma_1 \text{EPU}_{j,t-1} + \gamma_2 \text{EPU}_{j,t-1} \times X_{i,t-1} + \gamma_3 X_{i,t-1} + \text{Bank control}_{i,t-1} + \text{Macro}_{j,t} + \varepsilon_{i,j,t} \quad (2)$$

When examining whether the relation between EPU and bank lending depends on national prudential regulation, we employ two measures of macroprudential policies from Cerutti et al. (2017), including the macroprudential index (MPI), which is a simple sum of scores on 12 specific macroprudential policies, and the financial institutions-targeted macroprudential index (MPI_FI), which aggregates the 10 measures aimed at financial institutions' assets or liabilities. Regarding microprudential regulation, we adopt activity restriction and capital regulation indices from Barth et al. (2013). Higher values indicate greater stringency on overall restriction on banking activities and capital regulation, respectively. We therefore estimate the following model, where $\text{Prudential}_{j,t}$ represents country-level prudential regulation, including MPI, MPI_FI, activity restriction, and capital regulation in each specification, respectively:

[1] Our sample covers Australia, Brazil, Canada, Chile, China, France, Germany, India, Ireland, Italy, Japan, South Korea, Netherlands, Singapore, Spain, Sweden, the UK and US.

[2] Please visit the website of economic policy uncertainty: http://www.policyuncertainty.com/research.html.

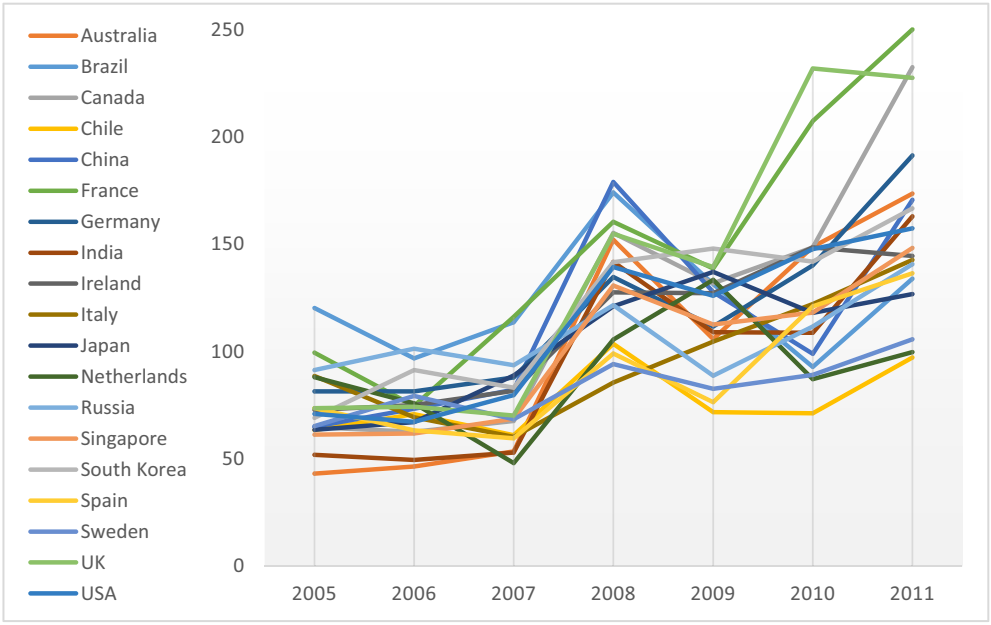

Fig. 1. Economic policy uncertainty in 19 countries during 2005–2011.
Source: policyuncertainty.com.

$$\text{Lending}_{i,j,t} = \alpha_i + \beta_t + \gamma_1 EPU_{j,t-1} + \gamma_2 EPU_{j,t-1} \times \text{Prudential}_{j,t-1} + \gamma_3 \text{Prudential}_{j,t-1} + \text{Bank control}_{i,t-1} + \text{Macro}_{j,t} + \varepsilon_{i,j,t} \quad (3)$$

We ultimately compile a sample of 10,151 unique banks in 19 countries over 2005–2011. Table 1 presents the descriptive statistics.

3. Empirical results

Column 1 of Table 2 presents the baseline regression where EPU enters with a coefficient of −6.588 (significant at the 5% level), suggesting a decline in bank loan growth following periods of high EPU. This finding is consistent with the view that banks tend to restrain credit expansion when uncertainty elevates. The effect is also economically sizable, as a one standard deviation increase in log EPU (0.32) may depress the growth rate of net loans by 2.11 percentage points (6.588*0.32), accounting for 27.73% of the sample mean (7.61%). In unreported tests, our results continue to hold when excluding US banks or using growth rates of bank assets as an

Table 1
Descriptive statistics.

	Obs	Mean	SD	P1	P50	P99	Source
Growth of loans	63960	7.61	27.73	−32.64	2.17	188.60	Bankscope
Growth of assets	63960	6.97	20.40	−26.81	2.64	125.90	Bankscope
EPU	63960	108.21	34.13	43.04	93.61	250.13	Baker et al. (2016)
log EPU	63960	4.63	0.32	3.76	4.54	5.52	Baker et al. (2016)
Size	63960	5.24	1.70	2.20	4.95	11.59	Bankscope
Capitalization	63960	11.48	5.98	3.74	10.00	47.57	Bankscope
ROA	63960	0.66	1.24	−4.69	0.78	4.19	Bankscope
LLP	63960	12.37	19.93	−7.70	5.38	117.52	Bankscope
NSFR	63958	117.60	26.77	53.45	112.03	239.34	Bankscope
Asset diversification	63960	52.69	25.39	1.29	51.78	99.40	Bankscope
GDP growth	63960	1.53	2.41	−7.82	2.22	15.24	WDI
Inflation	63960	2.90	2.25	−4.48	3.16	14.11	WDI
Credit	63960	177.93	38.88	25.92	187.85	206.30	WDI
Stock cap	63960	110.93	22.12	21.34	108.32	259.61	WDI
HHI	63960	0.05	0.03	0.04	0.05	0.51	Bankscope
MPI	63960	2.83	0.63	0	3	7	Cerutti et al. (2017)
MPI_FI	63960	2.82	0.60	0	3	5	Cerutti et al. (2017)
Activity restriction	63960	8.14	0.90	3	8	10	Barth et al. (2013)
Capital regulation	63960	7.04	1.06	3	7	10	Barth et al. (2013)

Table 2
Bank lending, EPU and bank heterogeneity.

The dependent variable is the growth rate of net loans. All variables apart from country-specific controls are lagged one period. Bank controls are winsorized at the 1% and 99% levels. Robust standard errors are clustered at the bank level and reported in parentheses below the coefficient estimates. ***, **, * denote significance at 1%, 5% and 10% levels, respectively.

Growth of loans	(1)	(2)	(3)	(4)	(5)
log EPU	−6.588**	−0.834	1.270	−7.024**	−10.223***
	(2.562)	(3.340)	(2.572)	(3.080)	(2.699)
log EPU * Size		−0.684***			
		(0.221)			
log EPU * LLP			−0.488***		
			(0.036)		
NSFR				0.267***	
				(0.088)	
log EPU * NSFR				0.033*	
				(0.018)	
Asset diversification					−0.191***
					(0.063)
log EPU * Asset diversification					0.082***
					(0.013)
Size	−29.562***	−26.265***	−28.904***	−27.936***	−28.989***
	(1.019)	(1.605)	(1.009)	(0.989)	(1.023)
Capitalization	2.274***	2.288***	2.143***	1.732***	2.212***
	(0.077)	(0.078)	(0.078)	(0.078)	(0.077)
ROA	−1.827***	−1.843***	−2.031***	−1.142***	−1.680***
	(0.216)	(0.216)	(0.215)	(0.208)	(0.215)
LLP	−0.171***	−0.169***	2.176***	−0.146***	−0.165***
	(0.011)	(0.011)	(0.177)	(0.010)	(0.011)
GDP growth	1.175***	1.146***	1.012***	1.130***	1.192***
	(0.183)	(0.183)	(0.182)	(0.177)	(0.182)
Inflation	−0.082	−0.044	−0.074	−0.062	−0.074
	(0.284)	(0.285)	(0.282)	(0.273)	(0.281)
Credit	0.162***	0.195***	0.201***	0.195***	0.154***
	(0.039)	(0.040)	(0.039)	(0.040)	(0.040)
Stock cap	0.084*	0.078	0.079	0.061	0.074
	(0.049)	(0.049)	(0.049)	(0.047)	(0.049)
HHI	−25.886	−26.096	−16.047	−16.406	−29.473
	(25.070)	(24.778)	(25.086)	(23.185)	(24.878)
Constant	126.057***	93.729***	81.818***	72.710***	132.746***
	(16.747)	(20.502)	(16.669)	(18.043)	(17.240)
Bank FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	63960	63960	63960	63958	63960
Adj R-square	0.364	0.365	0.372	0.411	0.376

alternative dependent variable.

It is important to ask whether the EPU effect we observe is attributable to changes in demand, or is supply driven. To disentangle the supply and demand effects is a common challenge in empirical studies.[3] In this paper we follow Bordo et al. (2016) and examine whether the impact of EPU varies with banks' balance sheet conditions. Columns 2 to 5 of Table 2 gauge the heterogeneous effects on different banks by interacting the EPU index with various bank characteristics. In particular, the interaction term of EPU and bank size enters negatively and significantly in column 2, suggesting a more pronounced negative EPU effect on lending growth for larger banks. This result is in line with the findings for US banks in Bordo et al. (2016). Examining the effects related to bank risk, column 3 reports a greater effect for banks with higher loan loss provisions, implying that EPU slows credit growth more for riskier banks needing to set aside more loan loss provisions. In column 4, the coefficient of EPU interacting with bank NSFR is significantly positive, working to offset the direct negative effect of EPU on lending. It confirms a weaker effect by EPU on more liquid banks with higher net stable funding ratios, confirming the role of bank liquidity in alleviating the negative effect of EPU on bank credit. Lastly, we find that the negative impact of EPU on bank loan growth is significantly smaller for banks with a more diversified portfolio, implying a shielding effect from asset diversification.

The usage of macroprudential policies has been shown to be associated with reductions in credit growth (Cerutti et al., 2017). Intended to stabilize the financial system and smooth credit cycles, macroprudential policies may partially address financial institutions' sensitivity to policy uncertainty (Gissler et al., 2016). We hence expect a weaker impact of EPU on bank lending when

[3] It is a drawback that we are unable to perfectly control for demand effects (for instance, firms hold back investments or households reduce consumption), even if we control for a set of macroeconomic variables. Our exercises nevertheless provides some evidence that the loan supply is affected by EPU and how this impact depends on bank characteristics.

Table 3
Bank lending, EPU and prudential regulation.

The dependent variable is the growth rate of net loans. All variables apart from country-specific controls are lagged one period. Bank controls are winsorized at the 1% and 99% levels. For brevity, we do not report the estimates for bank and country controls. Robust standard errors are clustered at the bank level and reported in parentheses below the coefficient estimates. ***, **, * denote significance at 1%, 5% and 10% levels, respectively.

Growth of loans	(1)	(2)	(3)	(4)
log EPU	−10.244***	−9.761***	−33.399***	−27.794***
	(3.422)	(3.347)	(7.041)	(5.775)
MPI	−9.341***			
	(3.600)			
log EPU * MPI	1.625**			
	(0.752)			
MPI_FI		−13.027***		
		(3.938)		
log EPU * MPI_FI		1.866**		
		(0.822)		
Activity restriction			−21.718***	
			(4.372)	
log EPU * Activity restriction			4.080***	
			(0.883)	
Capital regulation				−16.549***
				(3.462)
log EPU * Capital regulation				3.287***
				(0.713)
Constant	141.836***	141.969***	273.749***	231.924***
	(19.087)	(18.590)	(36.459)	(29.793)
Bank controls	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	63960	63960	63960	63960
Adj R-square	0.365	0.365	0.365	0.365

stronger macroprudential regulations are in place. In the first two columns of Table 3 we find both EPU and macroprudential indices curb bank lending, in line with existing literature. On the contrary, the positive and significant estimated coefficients for the interaction terms of EPU and macroprudential indices reflect that both country level macroprudential index and financial institutions-targeted macroprudential index significantly weaken the negative effect of EPU on bank lending. In columns 3 and 4, we continue to find significantly positive estimates for the interaction terms between activity restriction index (capital regulation index) and EPU, suggesting that microprudential policies are also effective in stabilizing bank lending at a time of high uncertainty. In sum, both macroprudential and microprudential policies appear to reduce the negative impact of EPU on bank lending.

Our results are less likely to be biased by reverse causality that credit growth of a single bank might influence the national EPU for two reasons. First, we use the average of monthly EPU indices one year leading up to the fiscal year of the banks. Hence, ex post lending is not likely to affect ex ante EPU. Second, nation-wide EPU is less likely to be driven by an individual bank. A more realistic assumption is that banks take variations in EPU as exogenous shocks. Nevertheless, we run the regressions that remove the top 5 banks in each country in terms of total assets, for fear that large banks may influence EPU. Our results hold for this subsample without large firms and are available upon request.

4. Conclusions

Using a large sample of international banks, we find that EPU may restrain bank lending, but the effect depends on bank characteristics and national prudential regulations. In particular, big banks and risky banks tend to have slower credit growth at a time of high EPU, while bank liquidity and asset diversification tend to experience greater credit growth relative to their less liquid and less diversified peers when facing the same EPU level. In addition, both macroprudential and microprudential policies are effective in moderating the unfavorable effect of uncertainty on bank credit.

Our study has important policy implications for regulators and policymakers. On top of the central role in maintaining financial stability, prudential regulations can also mitigate the adverse effect of uncertainty on bank lending.

Funding

This work is supported by the National Natural Science Foundation of China (Grant No.71803022), “the Fundamental Research Funds for the Central Universities” in UIBE (CXTD8-01), and “the Fundamental Research Funds for the Central Universities” in BFSU (2015QD008).

References

Akinci, O., Olmstead-Rumsey, J., 2018. How effective are macroprudential policies? An empirical investigation. J. Financ. Intermed. 33, 33–57.
Baker, S.R., Bloom, N., Davis, S.J., 2016. Measuring economic policy uncertainty. Q. J. Econ. 131 (4), 1593–1636.
Barth, J., Caprio, G., Levine, R., 2013. Bank regulation and supervision in 180 countries from 1999 to 2011. NBER Working Paper No. 18733.
Berger, A., Guedhami, O., Kim, H., Li, X., 2018. Economic policy uncertainty and bank liquidity creation. Working Paper.
Bordo, M., Duca, J., Koch, C., 2016. Economic policy uncertainty and the credit channel: aggregate and bank level U.S. evidence over several decades. J. Financ. Stab. 26, 90–106.
Bruno, V., Shim, I., Shin, H., 2017. Comparative assessment of macroprudential policies. J. Financ. Stab. 28, 183–202.
Cerutti, E., Claessens, S., Laeven, L., 2017. The use and effectiveness of macroprudential policies: new evidence. J. Financ. Stab. 28, 203–224.
Galati, G., Moessner, R., 2018. What do we know about the effectiveness of macroprudential policy. Economica 85 (340), 735–770.
Gissler, S., Oldfather, J., Ruffino, D., 2016. Lending on hold: regulatory uncertainty and bank lending standards. J. Monet. Econ. 81, 89–101.
Gulen, H., Ion, M., 2016. Policy uncertainty and corporate investment. Rev. Financ. Stud. 29 (3), 523–564.
He, Z., Niu, J., 2018. The effect of economic policy uncertainty on bank valuations. Appl. Econ. Lett. 25 (5), 345–347.
Laeven, L., Levine, R., 2007. Is there a diversification discount in financial conglomerates. J. Financ. Econ. 85 (2), 331–367.