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Economic policy uncertainty and cross-border lending

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ABSTRACT

Banks increase cross-border syndicated lending when domestic economic policy uncertainty is high, after controlling for credit demand at the borrower country or country-industry levels. The credit migration effects are strongest for banks with diverse income and when banks face fiercer competition. Using elections as a source of plausibly exogenous variation which positively affects political uncertainty, we provide causal evidence on the effects of political uncertainty on cross-border lending. In countries with exogenous election timings, banks increase cross-border lending during the election period, especially when elections are closely fought. Compared to the extant literature, which extensively documents the negative effect of uncertainty on real investment, our findings show that uncertainty affects investments in financial assets differently.

1. Introduction

There is overwhelming evidence in the recent literature that aggregate uncertainty is associated with lower investments in the real sector (e.g., Baker et al. (2016), Julio and Yook (2012)). Less work is done to understand the effects of aggregate uncertainty on financial assets, such as bank loans, which is where our paper aims to contribute. The effect of uncertainty on financial assets need not be the same as that on real assets. A key force driving the effect of uncertainty on real investment is that investments in some projects may be irreversible which makes the option to delay these projects valuable under uncertainty; uncertainty leads to deferment of projects to the future for precautionary motives (Bernanke (1983), Campello et al. (2018), Gulen and Ion (2015)), hence lowering contemporaneous real investment.

The valuable option-to-delay feature is absent in financial assets. Therefore, financial assets, such as loans, would price in higher uncertainty, but banks would not necessarily cut investments (such as lending) if the demand for the asset is held constant. Indeed, if the fee-generating investment banking business dries up or becomes unprofitable in uncertain times (e.g., Çolak et al. (2017), Gungoraydinoglu et al. (2017)), banks may re-focus towards the traditional banking business model and increase lending. Our paper tests this hypothesis, thereby highlighting a fundamental difference in how uncertainty affects real and financial assets.

We test the above hypothesis in the cross-border syndicated loan market. The reason we choose the cross-border setting is as follows. In order to test our hypothesis, we need to hold demand conditions constant since uncertainty affects real investments and various other aspects of corporate finance (e.g., Pham (2019), Im et al. (2020)). By studying the effect of domestic uncertainty in the lender country on cross-border lending, we isolate the supply-side effects by the use of appropriate fixed effects which net out the demand conditions at the borrower country level or the country-indiustry level. The application of this methodology is not feasible in

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the domestic market, as our primary independent variable of interest, the lender country uncertainty, would be subsumed by the fixed effects.

We ask two questions: first, how does domestic economic policy uncertainty (EPU) affect banks' cross-border credit supply, and second, is there cross-sectional variation in the effect of EPU on cross-border lending? Answering these questions present several empirical challenges:

Borrowers are exposed to a host of macroeconomic factors in their home countries which affects their demand for credit. To control for this possibility, we include the borrower country-quarter fixed effects in our bank-country-quarter level regressions. By including these fixed effects, we control for both observable and unobservable time-varying factors that affect credit demand in borrower countries. There is the remaining concern that demand effects may vary within a country. To address this concern, we estimate the regressions at the bank-industry-country-quarter level and include the borrower industry-country-quarter fixed effects. Through the use of the fixed effects, the concern that EPU is correlated across countries (Klößner and Sekkel (2014)) is also eliminated since we are implicitly controlling for the borrower country EPU. Additionally, we include the bank-borrower country (or the bank country-borrower country) fixed effects in some specifications to control for the bilateral relationships between the bank (or bank country) and the borrower country.

It remains possible that EPU and banks' cross-border lending is driven by a common factor, which would bias our inferences. In order to address this issue, we use national elections as a source of exogenous variation which positively affects political uncertainty (a related concept to policy uncertainty, but not identical), and test the effect of election-induced political uncertainty on banks' cross-border lending.

We discuss our main findings below:

In the baseline, we estimate the regressions at the bank-country-quarter level. We use two proxies for the quantity element of the credit supply curve: *Volume* (dollar amount) and *Number* (number of loans). We create these variables for each bank-country pair in each quarter of our sample. After controlling for credit demand at the borrower country level and the bilateral relationship between the bank and the borrower country, we find that higher lender country uncertainty is associated with increased cross-border lending. A 1% increase in the lender country policy uncertainty is associated with an increase in the cross-border lending volume of 8.8%, while the number of cross-border facilities is higher by 3.1%.

Next, we explore the cross-sectional variation in the effect of uncertainty on cross-border lending. First, we find that in times of high uncertainty credit migrates more aggressively if banks face fiercer competition in their domestic banking sector. Since banks obtain higher profits from lending in banking sectors characterized by high market power, it potentially makes them more tolerant of uncertainty. We obtain similar results when we consider competition from the bond market; a higher growth rate in the domestic bond market is associated with more aggressive increase in cross-border lending during times of uncertainty. With regards to bank characteristics, we find that banks with diverse income respond more aggressively by increasing cross-border lending when faced with increased domestic uncertainty.

In an extension to the baseline setting, we estimate the regressions at the bank-industry-country-quarter level. The dependent variables reflect quarterly lending by a bank to each industry in each country. In these regressions, we include the industry-country-quarter fixed effects, which control for demand conditions industry-by-industry in each country. The results are qualitatively the same. The magnitude of the effect of uncertainty is smaller compared to the baseline analysis; this is to be expected as we are controlling for demand more precisely in these regressions. After also taking into account the bilateral relationship between the bank country and the borrower country, a 1% increase in the lender country policy uncertainty is associated with an increase in the industry-level lending volume of 3.9%.

Next, we consider the effect of EPU on loan terms, which represent the price element of the supply curve. We find that the effect of increased uncertainty on loan spread and maturity is statistically insignificant. Higher uncertainty is associated with loans being secured more frequently; however, the effect becomes statistically insignificant when we include the bank fixed effects. Finally, loans during uncertain times contain fewer covenant restrictions. Overall, we do not find clear evidence that banks increase spread on cross-border loans in response to uncertainty, but uncertainty appears to affect the structure of the contracts consistent with the idea that banks intend to monitor more passively.

Finally, EPU and banks' cross-border lending may be driven by a common factor, which would bias our inferences. Therefore, we use elections as exogenous shocks to the level of political uncertainty, to identify more cleanly the causal effect of uncertainty on cross-border lending.

First, we consider the set of countries where elections have exogenous timings, as determined by the constitution. In these countries, election-induced uncertainty is arguably unaffected by the macroeconomic environment. The baseline regressions are at the bank-country-quarter level. On average, we do not find evidence that political uncertainty significantly affects cross-border lending. However, we find that when elections are closely fought, which indicates higher levels of political uncertainty, the conditional effect on banks' cross-border lending becomes positive and statistically significant. We look for cross-sectional variation in the sub-sample where the elections are closely-fought. We find evidence that banks with diverse income respond more aggressively to higher domestic political uncertainty, while we do not find any evidence of cross-sectional variation in the effect of elections on cross-border lending by country-level competition faced by banks (either within the banking sector or from the bond market). Similar findings are reproduced when we estimate the regressions at the bank-industry-country-quarter level. These findings are largely consistent with our earlier results using the EPU index as the proxy for uncertainty.

Next, we consider the set of countries where elections have flexible timings. In this sub-sample, it is not clear what political uncertainty represents since election timings are not exogenous. The ruling party has an incentive to call a snap election precisely when they are in a strong position, and the economy is faring well. E.g., Theresa May called the snap UK general election in 2017 as the

opinion polls consistently indicated that she would increase the existing majority in the parliament.[1] In this sub-sample, the unconditional effect of political uncertainty becomes negative, highlighting the differences between the level of uncertainty around constitutionally mandated and flexible elections.

2. Related literature

We contribute to a growing literature which considers the impact of economic policy uncertainty on various aspects of investment. Several studies document that uncertainty lowers real investment (e.g., Julio and Yook (2012), Baker et al. (2016). Jens (2017), Nguyen et al. (2018), An et al. (2016) and Hill et al. (2019)), and distorts the relationship between investment and the cost of capital (Drobetz et al. (2018)). Nguyen and Phan (2017) and Bonaime et al. (2018) document a negative relationship between economic policy uncertainty and domestic M&A activities; Cao et al. (2019) show that when uncertainty increases domestic firms' acquisition of foreign targets go up, and acquisition of domestic targets by foreign companies fall. We complement these studies since we examine how uncertainty affects investments in financial assets, specifically bank loans; compared to studies which focus on the effect of uncertainty on real investments, our exercise is important as uncertainty potentially affects financial and real investments differently.

Several theoretical papers highlight the importance of irreversibility of investment in driving the negative effects of uncertainty on contemporaneous real investment, as the value of waiting to invest increases in the presence of uncertainty (Bernanke (1983), Caballero (1991), Stokey (2016) and Bloom et al. (2007)). Empirically, Gulen and Ion (2015) and Bonaime et al. (2018) find that the negative effects of uncertainty on real investment are significantly stronger for firms with a higher degree of investment irreversibility. We contribute to this literature by studying an asset class which is devoid of the valuable option-to-delay feature and show that the negative relationship between uncertainty and investment disappears.

Matousek et al. (2020) finds that policy uncertainty makes financial firms vulnerable, especially in market downturns. Berg et al. (2020b) find that following the EU referendum in June 2016, loan issuances in the UK syndicated loan market reduced substantially; the reduction is driven by both UK and non-UK banks issuing fewer loans to UK firms. Different from Berg et al. (2020b), we aim to hold the demand-side constant and isolate the supply effects. In addition to the investment effects of EPU cited above, uncertainty affects numerous other aspects of corporate firms, such as dividend policy (Huang et al. (2015)), cost of equity (Pham (2019)) and optimal capital structure (Im et al. (2020)). Together these results suggest that uncertainty is likely to have an effect on the demand for credit. Hence, it is important to disentangle the demand and supply channels.

Bordo et al. (2016) study bank lending in the US and find evidence that EPU has a strong negative effect on US bank credit growth through the bank lending channel, which indirectly slowed the US economic recovery from the Great Recession. Consistent with this evidence, Berger et al. (2020) find that in response to EPU, banks increase liquidity hoarding. Since EPU affects both domestic lenders and borrowers, it is difficult for Bordo et al. (2016) to disentangle supply and demand effects. Our results complement these findings by studying cross-border lending and holding the demand-side constant.

Choi and Furceri (2019) are the first to study how uncertainty affects cross-border banking flows. They find that uncertainty reduces both cross-border lending and borrowing, but the latter effect dominates, so the net cross-border flows increase when uncertainty is higher. Different to them, we find that the absolute levels of cross-border flows in the syndicated loan market increase when uncertainty is elevated. The difference may be attributable to different samples (we use the syndicated loan market while they use the overall flows) and different methodologies. First, since we use relatively more granular data, in our study we can control for demand more precisely. In the strictest specifications we control for the demand at the industry-country level which allows for heterogeneity in demand effects within a country, while Choi and Furceri (2019) control for demand at the country level. Second, Choi and Furceri (2019) control for the bilateral relationship between the lender country and the recipient country using trade flows. We can completely net out the effect of bilateral relationships between the bank (not just the bank country) and the borrower country through the use of bank*borrower country fixed effects. Additionally, the granularity of our data on the lender side - we have bank level regressions, while Choi and Furceri (2019) have bank-country level regressions - allows us to conduct tests which are not possible in the setting of Choi and Furceri (2019); e.g., we can control for bank characteristics in our regressions using bank fixed effects or test how specific bank characteristics, such as income diversity, affect the sensitivity of cross-border lending to uncertainty. Finally, our analysis using the close elections in countries with constitution-mandated timings helps us to make a stronger causal link between uncertainty and cross-border lending.

Several studies suggest that the uncertainty affects loan pricing and induces higher cost of loans (e.g., Kim (2018), Waisman et al. (2015), Qi et al. (2010), Bradley et al. (2016) and Ashraf and Shen (2019)). Francis et al. (2014) show that an increase in firm-level exposure to political uncertainty is related to higher loan spreads. Non-price terms are also affected, as Datta et al. (2019) finds that elevated levels of policy uncertainty lead firms to shorten debt maturity. Different from these papers, we study cross-border loans only.

We also contribute to the literature which studies the international propagation of shocks through global banking operations. Several papers (e.g., Peek and Rosengren (1997), De Haas and Van Horen (2013) and Giannetti and Laeven (2012)) find evidence that negative shocks to the bank balance sheet, such as the financial crisis, are transmitted across countries through the channel of cross-border bank lending. To add to this literature, we identify economic policy uncertainty as another relevant factor which spills over across countries through international banking.

[1] It backfired for her, resulting in her having to form a minority government with the help of the Democratic Unionist Party of Northern Ireland. However, it remains true that the flexibility in calling an election may lead to a violation of the assumption that political uncertainty is exogenous to macroeconomic fundamentals.

3. Hypothesis development

We use the framework proposed in Campello et al. (2018) to guide our empirical analysis of the effect of uncertainty on bank lending.[2] In their real-options approach uncertainty adds noise to an outcome, while still preserving the mean. An increase in uncertainty increases the value to wait and defer real investment to the future since there are fixed costs of investment which is irreversible (see also Bernanke (1983)). This results in lower real investment during times characterized by high uncertainty, as real investment is deferred to the future. Indeed, Gulen and Ion (2015) find that the negative effects of uncertainty on real investment are significantly stronger for firms with a higher degree of investment irreversibility (see also Bonaime et al. (2018)).

How does uncertainty affect banks' credit supply? We conjecture that uncertainty does not affect banks' willingness to make loans in the same way as it affects real investment since bank loans (and financial assets, in general) do not possess a valuable option to delay. To the extent that uncertainty is priced in (either through price or non-price loan terms), banks are willing to provide credit regardless of the level of uncertainty.

Indeed, if investment banking business dries up in uncertain times and becomes less profitable due to higher volatility in the real sector (e.g., Baker et al. (2016)), banks may re-focus towards the traditional banking business model and increase lending. This effect is difficult to capture in the domestic market. On the one hand, demand for credit may be negatively affected due to deferment of investment projects, and on the other hand, demand may be higher due to precautionary considerations of firms (e.g., Duong et al. (2020) find increased cash-holding by firms in uncertain times). As any observed increase or decrease in lending is a combination of demand and supply in the credit market, in order to isolate the supply effect, we need to hold the demand-side constant. Therefore, we study cross-border lending as we can control for demand conditions at the borrower country level using the appropriate fixed effects. We expect that higher uncertainty is associated with increased cross-border lending. We state the baseline hypothesis below:

H1. :*Higher domestic EPU is associated with increased cross-border lending by banks.*

Further, we highlight two aspects which may be important from a cross-sectional variation perspective: the competition in the domestic credit market and the bank's business model.

In terms of the first, when the banking sector is itself competitive or faces more competition from alternative sources of funding (such as the bond market), banks facing uncertainty in the domestic markets would increase cross-border lending more aggressively. The implicit assumption is that banks would prefer to expand lending in the domestic market (possibly due to economies of scale effects), but if lending domestically is not profitable due to competition, they expand lending in foreign markets. In terms of the second, banks with more diverse income, who are arguably more exposed to uncertainty, would be more sensitive to increased domestic uncertainty. E.g., Çolak et al. (2017) find that fewer firms go public during election years in the US; in similar vein, Gungoraydinoglu et al. (2017) finds that in times of higher policy uncertainty, securities' placement costs are higher for intermediaries, due to increased information risk and weaker investment demand. This would have an adverse knock-on effect on the revenue of banks which are active in various fee-generating businesses. Therefore, such banks are disproportionately more affected by uncertainty. We state the following hypotheses:

H2. :*In times of high domestic EPU, banks facing more competition increase cross-border lending more than banks facing less competition.*

H3. :*In times of high domestic EPU, banks with more diverse income increase cross-border lending more than banks with traditional business models.*

4. Data

4.1. Loan data

The data on loan facilities comes from the DealScan database provided by Loan Pricing Corporation (LPC). DealScan provides the information on facility amount, each bank's share or contribution in the syndicate (allocation), loan spread, maturity, collateral, and covenant. Our sample contains all syndicated loans that were issued by 2215 banks to borrowers from 153 countries during Q2:2003-Q1:2019 (since the data for the main independent variable, EPU, which is lagged by one quarter in the regressions, is from Q1:2003 to Q4:2018), other than the loans issued to financial services firms (SIC codes between 6000 and 6999) which we drop from our sample. Since we only focus on cross-border lending, we exclude all observations when the borrower and the lender are domiciled in the same country. We observe the lenders' and borrowers' countries of incorporation from the DealScan database. We construct two sets of dependent variables: the first set proxies for the quantity element of the credit supply curve (*Volume, Number*) and the second set makes up of the price element (the price element includes both the price and non-price loan terms). Our analysis of the quantity element is at the bank-country-quarter level or the bank-industry-country-quarter level, while the analysis of the price element is at the facility level. The banks in our data are subsidiaries, as subsidiaries are separately licensed and supervised by the host-country authorities.

The baseline regressions are at the bank-country-quarter level. For each bank, we measure *Volume* (dollar amount) and *Number* (number of loans) to proxy for cross-border credit supply to individual destination countries in each quarter. Our first dependent variable, $Volume_{i,\,k,\,t}$, is the log of the total amount that bank i (in country j), lends to all firms in country k (with $k \neq j$), at time t. To

[2] We present a simple illustrative example in the Appendix.

create this variable, we sum up a bank's contribution to all its facilities during each quarter for each (foreign) country. DealScan contains information on facility allocation only for about 25% of all facilities. For the other 75%, we use a rule to calculate the contribution of a bank to the facility. Following evidence in Ivashina (2009), we assume that facilities in DealScan with missing allocation data are not systematically different from facilities for which the allocation data is available, which makes the missing data imputable. First, for each facility issued during our sample period with the loan allocation information available, we calculate the lead banks' share and participants' share. Then, we take the average values of the lead and participant shares in these facilities, which gives us the average lead banks' share as 52% and the average participant's share as 48%. Finally, in the facilities in which loan allocation information is missing, we divide 52% equally among the lead banks, and 48% equally among the participants. On average, a bank in our sample extends 223.877 million US dollars on the syndicated loan market to borrowers in a foreign country each quarter. Our second dependent variable, $Number_{i,\,k,\,t}$ is the log of the total number of loans made by bank i, to all firms in country k, at time t. On average, a bank issues 3.922 loans in a foreign country each quarter.

We similarly create the dependent variables at the bank-industry-country-quarter level. $Volume_{i,\,h,\,k,\,t}$ and $Number_{i,\,h,\,k,\,t}$ represent the log of the total lending (dollar amount and number of loans, respectively) that bank i (in country j), lends to firms in an industry h in country k (with $k \neq j$), at time t.

To test the effect of EPU on loan terms, we conduct facility-level regressions instead of aggregating the facilities at the bank-country-quarter level since loan terms are co-determined by lenders in a facility. We have four dependent variables, *Spread*, *Collateral*, *Covenant* and *Maturity*. First, following Drucker and Puri (2005), we use the LPC-reported 'all-in-spread drawn' (AISD) as the measurement of an interest rate for a loan, *Spread*, with a mean of 293 basis points in our sample. *Collateral* is a dummy variable which equals one if DealScan reports the loan as secured and zero otherwise, with roughly 61% of the loans in our sample being secured. *Covenant* records the number of covenants included in the loan. Loans in our sample carry between 0 and 3 covenants. *Maturity* is the maturity of the loan in months with sample mean 66 (5.5 years). Additionally, we use several loan characteristics as control variables in the loan-level regressions. *Revolver* is a dummy taking the value of one if the reported loan type is either" Revolver/Line < 1 Yr.," "Revolver/Line >= 1 Yr.," "364-Day Facility," "Revolver/Term Loan," or" Limited Line". *Senior* is a dummy variable indicating that the loan is a senior loan, while the *Loan Purpose* dummy indicates that the primary purpose of the loan is for corporate purposes. *Relationship* is the fraction of lenders in the syndicate with which the borrower has a prior lending relationship.

Table 1
Descriptive Statistics.

	N	Mean	Std. Dev.	Min	Max
Dependent variables					
Volume	80,341	223.877	766.549	0.000	52,072.570
Number	80,341	3.922	8.743	1.000	202.000
ln(1 + Volume)	80,341	17.956	1.612	12.965	23.312
ln(1 + Number)	80,341	1.236	0.671	0.693	5.142
Loan Characteristics					
Spread	32,882	292.980	175.987	20.000	900.000
Collateral	32,882	0.607	0.488	0.000	1.000
Covenant	32,882	0.293	0.732	0.000	3.000
Maturity	32,882	65.634	29.275	8.000	258.000
Relationship	32,882	0.420	0.494	0.000	1.000
Loan Size	32,882	18.978	1.512	14.952	22.110
Revolver	32,882	0.359	0.480	0.000	1.000
Senior	32,882	0.984	0.125	0.000	1.000
Loan Purpose	32,882	0.397	0.489	0.000	1.000
Country characteristics					
EPU	1196	4.756	0.491	2.866	6.613
EPU residuals	1196	0.009	0.312	−1.188	1.245
CPI	1196	0.005	0.007	−0.009	0.022
GDP growth rate	1196	0.823	2.629	−10.130	10.800
10-year yield	1196	3.855	2.168	0.035	8.001
Exchange rate	1196	70.955	226.070	0.506	970.800
Supervisory power	1196	10.436	2.405	5.385	14.500
Capital stringency	1196	4.537	1.751	2.000	7.000
Activity restrictions	1196	6.666	1.882	3.000	10.500
Election	1196	0.259	0.438	0.000	1.000
Margin of victory	987	0.058	0.123	0.000	0.434
Lerner index	900	0.241	0.255	−1.750	0.760
Bond growth rate	861	0.067	0.191	−0.240	0.587
Bank characteristics					
Income diversity	4717	0.469	0.273	0.000	0.988

The table presents the summary statistics of key variables used in our analysis. The main dependent variables are at the bank-country-quarter level. The loan characteristics are at the facility level. The country characteristics are at the country-quarter level. The bank characteristics are at the bank-quarter level. Variable definitions are found in Table 1 in the Online Appendix. We winsorize all data at the 1st and 99th percentiles.

Summary statistics are presented in Table 1. The number of observations for the variables denoting the quantity and price elements are different, since the quantity variables are aggregated at the bank-country-quarter level, while the price variables are disaggregated. However, both sets of variables are constructed using an identical number of loan facilities.

4.2. Economic policy uncertainty

We proxy economic policy uncertainty with the index constructed by Baker et al. (2016). It measures the monthly variation in political conditions. Following Baker et al. (2016), we calculate the quarterly EPU by taking the average of the EPU values across the three months in a quarter. The EPU index consists of three main components: an index of Google News search results that counts the month-by-month search results of news containing terms related to economic and policy uncertainty (adjusted by the total number of articles in the month); the scheduled expirations of federal tax code provisions provided by the Joint Committee on Taxation; and the disagreement in the forecasts of two measures: consumer price index (*CPI*) and federal purchases of goods and services one year in the future. A larger index value represents a higher level of policy uncertainty. They construct the EPU indices for the US and 22 other countries, including all G10 economies. An aggregated version, the Global EPU index, is also provided on their website. We drop Hong Kong and Colombia from our sample due to lack of regulation data, so we end up with 21 lender countries. Since the overall economic policy uncertainty index depends on different parts and the measurements for various countries start from different years, we focus on uncertainty indices based on news coverage from 2003 to 2018. Under this measurement method, the EPU of different countries is comparable.

The range of the countries' news-based EPU indicators is from 17.571 (EPU of Mexico in the third quarter of 2014) to 744.758 (EPU of China in the fourth quarter of 2018). The considerable variation in EPU allows us to test how different levels of EPU affect bank credit supply. Table 2 shows the average values and volatility of EPU for each of the 21 countries from 2003 to 2018. Mexico has the lowest average EPU value and Sweden has the lowest EPU volatility, while UK has the highest average EPU value and EPU volatility during our sample period.

4.3. Regulatory and macroeconomic variables

We include several regulatory variables in the lender country to control for the impact of the lender country regulatory environment on credit supply. Barth et al. (2013) provide a database with information on bank regulation, supervision, and monitoring in more than 100 countries. The database is compiled from worldwide surveys of bank regulation and supervision among financial regulators. We consider three regulatory indices, for each of which higher values indicate a more restrictive regulatory environment. *Official Supervisory Power* is an index that measures the extent to which the supervisory authorities in the country have the authority to take specific actions to prevent and correct banking problems. The variable ranges between 5.4 and 14.5 and has a sample mean of 10.4. *Capital Stringency* measures whether the capital requirement in the country reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined. The variable ranges between 2 and 7 and has a sample mean of 4.5. *Activity Restrictions* is an index of restrictions on various banking activities (securities, insurance, and real estate); it ranges between 3 and 10.5 with a sample mean of 6.67.

In addition, we control for the macroeconomic conditions in the lender country by including the *GDP Growth Rate*, consumer price index, *CPI*, and the exchange rate with US dollars, *Exchange Rate* in the regressions. The *10-year Treasury Yield* is also at the lender country-quarter level, and it controls for the liquidity condition in the lender country. The macroeconomic variables are taken from the Thomson Reuters Eikon database. Country-level bank market power is proxied by the *Lerner Index* (from the Federal Reserve Bank of St. Louis), and a higher value of the index represents higher market power. *Bond Growth Rate* is the growth rate in the private domestic debt securities issued by financial institutions and corporations as a share of GDP, and comes from the World Bank Financial Structure database; it represents the competition faced by the banking sector from its closest substitute as a form of external financing for domestic companies.

4.4. Bank income diversity

To test whether banks with diverse income respond differently to higher EPU compared to banks with traditional business models, we construct an *Income Diversity* variable using bank data. The bank data from BankScope is limited as BankScope data is available till 2016, and only for a sub-sample of the banks.[3] Following Laeven and Levine (2007), we construct *Income Diversity* as an index ranging from zero to one, and a bank is classified as having zero diversity if it only issues loans:

$$Income\ Diversity = 1 - \left| \frac{(net\ interest\ income - other\ income)}{total\ operating\ income} \right| \quad (1)$$

[3] Since there is no common identifier for DealScan and BankScope, bank names and locations are used to combine the two databases. For details of the matching process, please refer to Biswas et al. (2017).

Table 2
EPU country-by-country.

	Average EPU	*Std. Dev.*
Australia	102.578	53.381
Brazil	169.169	89.864
Canada	160.007	84.950
Chile	133.897	39.856
China	168.446	117.765
France	192.982	86.464
Germany	137.757	54.847
Greece	106.670	47.015
India	107.940	55.549
Ireland	125.951	43.221
Italy	107.424	32.240
Japan	103.614	29.610
South Korea	132.685	51.276
Mexico	75.501	30.255
Netherlands	94.018	36.480
Russia	146.903	60.624
Singapore	120.100	49.408
Spain	110.268	48.431
Sweden	91.664	17.054
United States	120.923	39.077
United Kingdom	214.271	144.351

This table presents the average value and standard deviation of each country's EPU. The sample spans 2003 to 2018.

5. Research design

We use quarterly data and conduct the baseline analysis at the bank-borrower country level. We analyze the relationship between the cross-border lending and the lender countries' economic policy uncertainty index, controlling for the macroeconomic and regulatory environment in the lender country. We estimate the following regression:

$$CS_{i,k,t} = \beta_1 + \beta_2 * EPU_{j,t-1} + \beta_3 * EPU_{j,t-2} + \beta_4 * EPU_{j,t-3} + \beta_5 * EPU_{j,t-4} + \beta_4 * C_{j,t-1} + \gamma_i + \delta_{k,t} + \varepsilon_{i,k,t} \quad (2)$$

where the dependent variable, $CS_{i,\,k,\,t}$, is cross-border credit supply of bank i in country j to borrowers in country k at time t. We use two different proxies for credit supply (*Volume*, *Number*). $EPU_{j,\,t}$ is the natural logarithm of the lender country j's economic policy uncertainty index at time t. To test if only the short-term EPU affects cross-border lending, we include the lags of EPU in the regressions. The vector $C_{j,\,t}$ consists of lender country macroeconomic and regulatory variables. The independent variables are lagged by one quarter to minimize endogeneity concerns. γ_i and $\delta_{k,\,t}$ are vectors of bank and borrower country-quarter fixed effect coefficients, respectively. We include the borrower country-quarter fixed effects in order to control for time-varying macroeconomic conditions affecting the borrower, including the credit demand at the borrower country level. The bank fixed effects control for time-invariant bank specific factors that might affect changes in lending behaviour. In some specifications, we further include the bank country*borrower country fixed effects or bank*borrower country fixed effects to account for the bilateral relationships between the bank country (or bank) and the borrower country. We use OLS to estimate the regressions and standard errors are double-clustered by lender-country and quarter to account for temporal and cross-sectional correlation (Petersen (2008), Julio and Yook (2012)).

Next, we augment Eq. (2) by including interaction terms as follows:

$$CS_{i,k,t} = \beta_1 + \beta_2 * EPU_{j,t-1} + \beta_3 * EPU_{j,t-2} + \beta_4 * EPU_{j,t-3} + \beta_5 * EPU_{j,t-4} + \beta_6 * C_{j,t-1} + \beta_7 * X_{i/j,t-1} + \beta_8 * EPU_{j,t-1} * X_{i/j,t-1} + \gamma_i + \delta_{k,t} + \varepsilon_{i,k,t} \quad (3)$$

By estimating the equation above, we test for cross-sectional differences in how banks respond to increased EPU. X is at the bank-level or the lender country-level, and the interaction term captures the cross-sectional variation. If the coefficient, β_8, is positive (negative) it indicates that the effect of EPU is positively (negatively) correlated with the variable, X. Indeed, if $\beta_8 > 0$ and the inclusion of the interaction term renders the stand-alone coefficient on EPU, β_2, statistically insignificant, it would indicate that the effect is entirely driven by the sub-sample with high values of X (low values of X, if $\beta_8 < 0$).

In an extension, we further sharpen our identification by the estimating the regressions at the bank-industry-country-quarter level and including the industry*country*quarter fixed effects. Doing so allows us to further control the demand effects at the industry level, separately for each country. We note that sharper identification comes at a cost, as there are potential spillover effects which are ignored, which in turn introduces bias into the direct effects (Berg et al. (2020a)). As we are interested in the overall effects (the sum of the direct and spillover effects), we report the regressions at the bank-country-quarter level as the baseline, while showing that we obtain similar results when estimating the regressions at the bank-industry-country-quarter level.

6. Empirical results

6.1. Baseline results: Bank-country-quarter level

In Table 3, we test the hypothesis, *H1*, which states that economic policy uncertainty of the bank's home country positively affects the bank's cross-border lending behaviour, as measured by our dependent variables, *Volume* and *Number* (Eq. (2)). In the *Volume* regression (column (1)), we find a positive and statistically significant coefficient on lender country EPU. A higher level of economic policy uncertainty in the lender country is associated with an increased cross-border lending volume. A 1% increase in the lender country EPU index is associated with an increase in the cross-border lending volume by 10.1%. In the *Number* regression (column (2)), the coefficient on EPU is positive and statistically significant at the 1% level. A 1% increase in the lender country EPU index is associated with 3.3% more cross-border facilities on average issued by a bank to a borrower country each quarter.

There is possibility that relationships between the lender's country and borrower's country could affect the bank's lending decision. For example, lending relationships tend to be much stronger when countries are physically close. Therefore, in columns (3) and (4), we further include the bank country*borrower country fixed effects. The coefficients of EPU in both *Volume* and *Number* regressions remain positive and statistically significant at the 1% level. Next, in columns (5) and (6), we further include the bank*borrower country fixed effects in order to account for the impact of the relationships between the lender and borrower's country on banks' lending. The positive and statistically significant coefficients of EPU index suggest that a 1% increase in lender country EPU index is associated with 8.8% increase in *Volume* and 3.1% increase in *Number*. These findings are consistent with our hypothesis that under increased domestic economic policy uncertainty, banks increase cross-border lending.

While the coefficients on the most recent EPU remains positive and statistically significant in all regressions, the coefficients on the lags are insignificant. This indicates that only the short-term lender country EPU affects the bank's credit supply decision. The result may be surprising as it suggests that banks react quickly to the build-up of uncertainty. However, it is not infeasible for banks to react quickly as our measures of credit supply are at the intensive margin (at the country level). So, reallocating resources need not entail

Table 3
EPU and cross-border credit supply: bank-country-quarter level analysis.

	Baseline		*Add Bank country* Borrower country fe*		*Add Bank * Borrower country fe*	
	Volume	*Number*	*Volume*	*Number*	*Volume*	*Number*
	(1)	(2)	(3)	(4)	(5)	(6)
EPU	0.101***	0.033***	0.085***	0.026***	0.088**	0.031**
	(3.18)	(4.29)	(2.90)	(3.30)	(2.79)	(2.26)
l.EPU	−0.033	−0.010	−0.028	−0.007	−0.024	−0.008
	(−0.99)	(−0.69)	(−0.75)	(−0.44)	(−0.57)	(−0.37)
l2.EPU	0.003	−0.015	−0.008	−0.015	−0.005	−0.011
	(0.11)	(−1.02)	(−0.27)	(−1.00)	(−0.15)	(−0.69)
l3.EPU	−0.012	0.011	−0.009	0.010	−0.017	0.012
	(−0.37)	(1.07)	(−0.27)	(0.82)	(−0.59)	(0.78)
GDP Growth Rate	−0.003	0.000	−0.003	−0.000	−0.002	0.001
	(−1.39)	(0.24)	(−1.09)	(−0.15)	(−0.68)	(1.02)
CPI	−0.039	0.044	0.150	−0.025	1.132	0.173
	(−0.03)	(0.07)	(0.11)	(−0.04)	(1.03)	(0.23)
10-Year Yield	0.049**	−0.009	0.042*	−0.007	0.046*	−0.006
	(2.18)	(−1.50)	(1.78)	(−1.04)	(1.74)	(−0.73)
Exchange Rate	−0.004*	0.000	−0.003	0.001	−0.002	0.001**
	(−1.80)	(0.08)	(−1.63)	(1.29)	(−0.71)	(2.18)
Supervisory Power	−0.001	0.001	0.004	0.003	0.003	0.002
	(−0.12)	(0.20)	(0.50)	(0.66)	(0.32)	(0.25)
Capital Stringency	0.004	0.006*	0.004	0.007*	0.005	0.006
	(0.37)	(1.89)	(0.33)	(1.80)	(0.39)	(1.07)
Activity Restrictions	−0.018	−0.006	−0.008	−0.004	−0.008	0.000
	(−0.85)	(−0.72)	(−0.42)	(−0.45)	(−0.40)	(0.02)
Observations	80,341	80,341	80,080	80,080	72,562	72,562
Adj. R^2	0.471	0.354	0.493	0.406	0.564	0.569
Bank fe	Yes	Yes	Yes	Yes	No	No
Bank country*Borrower country fe	No	No	Yes	Yes	No	No
Bank*Borrower country fe	No	No	No	No	Yes	Yes
Borrower country*Quarter fe	Yes	Yes	Yes	Yes	Yes	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the impact of economic policy uncertainty on the cross-border credit supply. The dependent variables, *Volume* (dollar amount) in the odd-numbered columns, and *Number* (number of loans) in the even-numbered columns, are at the bank-country-quarter level. The macroeconomic and regulatory variables for the lender country are at the country-quarter level. Variable definitions are found in Table 1 in the Online Appendix. Bank and borrower country*quarter fixed effects are included in all regressions. In columns (3)–(6), we include additional fixed effects: the bank country*borrower country fixed effects in columns (3, 4), and the bank*borrower country fixed effects in columns (5, 6). *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

high costs as it would if we were looking at the extensive margin (increasing credit supply by initiating lending in a new country or reducing lending by exiting a country).

6.2. Robustness tests: Bank-country-quarter level

Table 4 presents a wide range of additional robustness results; each specification includes the bank*borrower country fixed effects to control for bilateral relationships and the borrower country*quarter fixed effects to control for demand at the country-level.

The first robustness test concerns the exchange rate movements in the lender's country (columns (1)–(2)). Although we minimize the impact of exchange rate by controlling for the lender country's exchange rate in the regressions, we further mitigate this issue by removing all quarters in which the lender country's exchange rate moved more than 10%. The coefficient on EPU enters positively and statistically significantly in both the *Volume* and *Number* regressions, which is consistent with our previous findings. This implies that our results are not driven by wild fluctuations in the currency market.

Existing papers show that cross-border credit supply contracts during crisis periods (e.g., De Haas and Van Horen (2013) and Giannetti and Laeven (2012)). As crisis periods are also likely to be periods of policy uncertainty, we need to be able to separate the effects of crisis from policy uncertainty. In columns (3)–(6), we split our sample into crisis and non-crisis periods, where the crisis period is 2007–2012, covering the global financial crisis and the European sovereign debt crisis. The idea is that the non-crisis period analysis should provide a cleaner estimate of the effect of EPU. *Re*-estimating the baseline regressions, separately for the crisis and non-crisis periods, we find that the coefficient on EPU is positive for both the *Volume* and *Number* regressions in both sub-samples, but

Table 4
Robustness tests.

	Exclude Forex Movements>10%		*No Crisis*		*Crisis*		*EPU Residuals*		*Borrower EPU*	
	Volume	*Number*	*Volume*	*Number*	*Volume*	*Number*	*Volume*	*Number*	*Volume*	*Number*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EPU	0.078**	0.029*	0.123**	0.049**	0.010	0.014	0.088**	0.031**	0.107**	0.043*
	(2.33)	(2.05)	(2.66)	(2.36)	(0.23)	(0.67)	(2.79)	(2.26)	(2.31)	(1.95)
Borrower Country EPU									−0.107**	−0.008
									(−2.62)	(−0.34)
l.EPU	−0.023	−0.009	0.007	−0.003	−0.054	−0.021	−0.024	−0.008	−0.005	−0.014
	(−0.53)	(−0.42)	(0.13)	(−0.08)	(−0.87)	(−1.05)	(−0.57)	(−0.37)	(−0.16)	(−0.56)
l2.EPU	0.002	−0.009	−0.031	−0.023	0.068	0.008	−0.005	−0.011	0.041	0.000
	(0.07)	(−0.53)	(−0.85)	(−0.90)	(1.26)	(0.44)	(−0.15)	(−0.69)	(1.14)	(0.01)
l3.EPU	−0.015	0.012	−0.008	0.030	−0.050	−0.006	−0.017	0.012	−0.019	0.006
	(−0.52)	(0.74)	(−0.29)	(1.64)	(−0.93)	(−0.25)	(−0.59)	(0.78)	(−0.37)	(0.27)
GDP growth rate	−0.003	0.001	−0.004	−0.001	−0.003	0.003*	−0.002	0.001	−0.005	0.002
	(−0.67)	(0.79)	(−1.12)	(−0.96)	(−0.32)	(1.84)	(−0.68)	(1.02)	(−1.39)	(1.37)
CPI	1.101	0.081	2.532**	−0.327	−3.023	−0.664	1.132	0.173	0.764	0.445
	(0.92)	(0.11)	(2.10)	(−0.39)	(−1.55)	(−0.81)	(1.03)	(0.23)	(0.45)	(0.42)
10-Year Yield	0.048*	−0.007	0.049	−0.006	−0.026	−0.032	0.046*	−0.006	0.057	−0.003
	(1.73)	(−0.77)	(1.32)	(−0.52)	(−0.72)	(−1.34)	(1.74)	(−0.73)	(1.35)	(−0.25)
Exchange rate	−0.001	0.001**	−0.001	0.001	−0.003	0.000	−0.002	0.001**	−0.002	0.001***
	(−0.54)	(2.26)	(−0.52)	(0.80)	(−1.35)	(0.21)	(−0.71)	(2.18)	(−1.20)	(2.99)
Supervisory power	0.004	0.001	0.009	0.005	0.005	0.001	0.003	0.002	0.004	−0.002
	(0.40)	(0.22)	(0.54)	(0.39)	(0.40)	(0.08)	(0.32)	(0.25)	(0.25)	(−0.16)
Capital stringency	0.005	0.005	0.019	0.011	−0.007	−0.001	0.005	0.006	0.015	0.010
	(0.41)	(0.99)	(0.85)	(0.95)	(−0.86)	(−0.11)	(0.39)	(1.07)	(0.75)	(1.28)
Activity restrictions	−0.008	−0.000	−0.023	0.000	−0.008	−0.015	−0.008	0.000	−0.004	−0.000
	(−0.40)	(−0.01)	(−0.75)	(0.00)	(−0.29)	(−0.73)	(−0.40)	(0.02)	(−0.13)	(−0.01)
Observations	70,645	70,645	45,438	45,438	23,813	23,813	72,562	72,562	47,790	47,790
Adj. R^2	0.564	0.569	0.568	0.584	0.583	0.586	0.564	0.569	0.503	0.540
Bank*Borrower country fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower country*Quarter fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Borrower country, Quarter fe	No	No	No	No	No	No	No	No	Yes	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the impact of economic policy uncertainty on the credit supply. The dependent variables, *Volume* (dollar amount) in the odd-numbered columns, and *Number* (number of loans) in the even-numbered columns, are at the bank-country-quarter level. In the first two columns, we remove all quarters in which the exchange rate moved more than 10% and re-estimate the baseline with the strictest fixed effects. In columns (3–6), we examine the impact of economic policy uncertainty on the credit supply during crisis periods and non-crisis periods. We define the crisis periods as the years from 2007 to 2012, covering the Global Financial Crisis and European Sovereign Debt Crisis. In columns (7, 8), we use the residuals from regressing the lender country EPU on the Global EPU. In columns (9) and (10), we include the borrower country's EPU in the regression. The country level controls are the macroeconomic and regulatory variables for the lender country. Variable definitions are found in Table 1 in the Online Appendix. Bank*borrower country fixed effect is included in all regressions. Borrower country*quarter fixed effect is included in the first eight regressions. In columns (9, 10), we include the borrower country and quarter fixed effects. *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

statistically significant only in the non-crisis period sub-sample.

Why might the effects of crisis and policy uncertainty on bank lending be different? We have two conjectures: The difference might be driven by the fact that the crisis periods were a much more direct crisis for the banking sectors around the world, whereas policy uncertainty during non-crisis periods affects banks in an indirect way, as uncertainty does not affect investment in financial assets the same way as it does real investment. The empirical evidence we provide seem to be consistent with this conjecture. Additionally, the crisis periods were associated with increased uncertainty across the world. This would limit the banks' ability to increase lending in foreign destinations characterized by low uncertainty, as majority of countries faced similar levels of uncertainty. In non-crisis periods, there is more cross-sectional variation in EPU, which the banks exploit by flying to foreign destinations when domestic uncertainty is raised.

It is possible that EPU is correlated across countries. Although we minimize the impact by using the borrower country*quarter fixed effects, we further mitigate this concern by adjusting the EPU variable. In columns (7, 8), we regress the country EPU on the Global EPU, and use the residual as our independent variable (instead of the EPU itself): the residual captures the country-level uncertainty that is orthogonal to the uncertainty in the rest of the world. The coefficients on the lender country-specific EPU (proxied by the residual from regressing lender country EPU on the Global EPU based on current-price GDP measure) are positive and significant at 5% level. The results remain similar when we use Global EPU based on PPP-adjusted GDP instead. This indicates that when lender country EPU increases relative to world EPU, banks increase cross-border lending.

In columns (9, 10), in addition to the lender country EPU, we also include the borrower country EPU variable in the regressions. We use the borrower country and quarter fixed effects separately in order to estimate the coefficient on the borrower country EPU variable. The coefficient on lender country EPU in both the *Volume* and *Number* regressions remain positive and statistically significant. The coefficient on borrower country EPU is negative in both regressions and statistically significant in the *Volume* regression. The latter

Table 5
EPU and cross-sectional heterogeneity.

	Lender Lerner		*Bond Growth*		*Income Diversity*	
	Volume	*Number*	*Volume*	*Number*	*Volume*	*Number*
	(1)	(2)	(3)	(4)	(5)	(6)
EPU	0.069**	0.024**	0.122***	0.030**	0.003	−0.038*
	(2.52)	(2.25)	(3.37)	(2.72)	(0.04)	(−1.89)
EPU*X	−0.029	−0.029**	0.474*	0.100	0.003***	0.002*
	(−1.25)	(−2.51)	(2.04)	(1.24)	(4.15)	(1.83)
X	0.158	0.161**	−2.089*	−0.443	−0.013***	−0.007*
	(1.16)	(2.41)	(−1.95)	(−1.16)	(−3.79)	(−1.79)
l.EPU	−0.038	−0.003	−0.054	−0.012	−0.065	−0.022
	(−0.98)	(−0.18)	(−1.32)	(−0.75)	(−0.90)	(−0.98)
l2.EPU	−0.004	−0.009	0.044	−0.001	0.027	0.019
	(−0.12)	(−0.76)	(1.13)	(−0.07)	(0.42)	(0.90)
l3.EPU	−0.017	0.007	−0.003	0.008	0.066	0.007
	(−0.49)	(0.56)	(−0.09)	(0.56)	(0.79)	(0.21)
GDP Growth Rate	−0.003	0.000	−0.002	0.001	−0.009	0.001
	(−1.09)	(0.30)	(−0.42)	(0.73)	(−0.98)	(0.51)
CPI	−0.193	−0.608	−2.583	−0.589	−6.472**	−1.967
	(−0.12)	(−0.93)	(−1.36)	(−0.61)	(−2.50)	(−1.22)
10-Year Yield	0.030	−0.013	0.039	−0.020	0.052	−0.007
	(1.04)	(−1.02)	(1.61)	(−1.22)	(1.31)	(−0.36)
Exchange rate	−0.002	0.001	−0.003	0.001	0.003	0.003**
	(−1.48)	(1.37)	(−1.23)	(0.85)	(1.20)	(2.70)
Supervisory power	−0.003	−0.001	−0.012*	−0.002	−0.003	−0.007
	(−0.37)	(−0.46)	(−2.06)	(−0.70)	(−0.34)	(−1.37)
Capital stringency	0.003	0.009***	−0.010	0.011*	−0.081**	0.006
	(0.31)	(3.45)	(−0.58)	(2.03)	(−2.50)	(0.52)
Activity restrictions	0.002	−0.008*	0.010	−0.008	0.074**	−0.008
	(0.18)	(−2.07)	(0.51)	(−1.48)	(2.58)	(−1.08)
Observations	63,480	63,480	49,864	49,864	17,248	17,248
Adj. R^2	0.498	0.409	0.523	0.425	0.507	0.420
Bank fe	Yes	Yes	Yes	Yes	Yes	Yes
Bank country*Borrower country fe	Yes	Yes	Yes	Yes	Yes	Yes
Borrower country*Quarter fe	Yes	Yes	Yes	Yes	Yes	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the *conditional* impact of EPU on credit supply. The dependent variables, *Volume* (dollar amount) in the odd-numbered columns, and *Number* (number of loans) in the even-numbered columns, are at the bank-country-quarter level. In each regression we include one of the variables indicated in the column header in place of X. In columns (1, 2), EPU is interacted with *Lerner Index*. In columns (3, 4), EPU is interacted with *Bond Growth Rate*. In columns (5, 6), EPU is interacted with *Income Diversity*. The country level controls are the macroeconomic and regulatory variables for the lender country. Variable definitions are found in Table 1 in the Online Appendix. Bank, bank country*borrower country and borrower country*quarter fixed effects are included in all regressions. *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

finding suggests that foreign lenders reduce lending in countries experiencing higher EPU, with the qualification that we cannot control for credit demand in these regressions. Overall, the results reinforce the idea that banks rebalance away from borrowers in countries experiencing high uncertainty towards borrowers in countries experiencing lower uncertainty.

6.3. Cross-sectional heterogeneity: Bank-country-quarter level

In this section, we test hypotheses *H2* and *H3*, which state that the effect of uncertainty on cross-border lending varies in the cross-section (Eq. (3)). We report the findings in Table 5.

We first consider the effect of the degree of market power in the banking sector in the lender country in columns (1,2). We expect that banks located in countries with more market power will respond less aggressively to increased EPU. The idea is that if it is more profitable to conduct business domestically due to high market power, banks may be more tolerant of domestic uncertainty. We augment the baseline by including the lender country bank market power and interacting it with the lender country EPU. In both the *Volume* and *Number* regressions, the stand-alone coefficient on EPU remains positive and statistically significant. The coefficient on the interaction term enters both regressions negatively, and statistically significantly in the *Number* regression. The results indicate that banks facing high EPU increase lending more aggressively if the competition in the domestic banking sector is more fierce. When the lender country *Lerner index* is 0.16 (25th percentile), a 1% increase in EPU leads to an increase in the number of cross-border loans by $(0.024 - 0.029 * 0.16) * 100\ \% = 1.94\%$. When the lender country *Lerner index* is 0.34 (75th percentile), a 1% increase in EPU leads to an increase in the number of cross-border loans by $(0.024 - 0.029 * 0.34) * 100\ \% = 1.41\%$, so the difference is economically significant.

Next, we consider the growth rate in the bond market in the lender country in columns (3, 4). The closest substitutes for bank loans are bonds. This is especially true for loans in our sample as typically, the borrowers in the syndicated loan market have access to bond financing and possess credit ratings. If the bond market is growing rapidly, it indicates that banks face more competition from the bond markets domestically. Then, any uncertainty-induced increase in lending in the domestic market would be hampered by competition from the bond market, and banks will increase lending more aggressively in the cross-border market. We augment the baseline by

Table 6
EPU and cross-border credit supply: Bank-industry-country-quarter level analysis.

	Baseline		*Add Bank country* Borrower country fe*	
	Volume	*Number*	*Volume*	*Number*
	(1)	(2)	(3)	(4)
EPU	0.052**	0.002	0.039*	−0.003
	(2.54)	(0.19)	(1.88)	(−0.29)
l.EPU	0.001	0.006	0.003	0.008
	(0.06)	(0.61)	(0.14)	(0.77)
l2.EPU	−0.018	−0.000	−0.022	−0.001
	(−0.72)	(−0.03)	(−0.86)	(−0.06)
l3.EPU	−0.014	0.006	−0.013	0.006
	(−0.54)	(0.55)	(−0.47)	(0.50)
GDP Growth Rate	−0.001	0.001*	−0.001	0.001
	(−0.42)	(1.81)	(−0.44)	(1.35)
CPI	0.578	0.477	0.702	0.390
	(0.48)	(1.02)	(0.59)	(0.90)
10-Year Yield	0.027	−0.003	0.025	−0.002
	(1.66)	(−0.75)	(1.56)	(−0.50)
Exchange rate	−0.000	0.001**	−0.000	0.001***
	(−0.01)	(2.70)	(−0.03)	(3.23)
Supervisory power	0.005	0.002	0.005	0.002
	(0.81)	(0.57)	(0.84)	(0.67)
Capital stringency	0.002	0.002	0.002	0.002
	(0.16)	(0.63)	(0.20)	(0.76)
Activity restrictions	−0.014	−0.007	−0.008	−0.006
	(−1.22)	(−1.62)	(−0.72)	(−1.06)
Observations	126,650	126,650	126,384	126,384
Adj. R^2	0.581	0.411	0.590	0.430
Bank fe	Yes	Yes	Yes	Yes
Bank country*Borrower country fe	No	No	Yes	Yes
Borrower industry*Country*Quarter fe	Yes	Yes	Yes	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes

This table shows the impact of economic policy uncertainty on the credit supply. The dependent variables, *Volume* (dollar amount) in the odd-numbered columns, and *Number* (number of loans) in the even-numbered columns, are at the bank-industry-country-quarter level. The country level controls are the macroeconomic and regulatory variables for the lender country. Variable definitions are found in Table 1 in the Online Appendix. Bank and industry*country*quarter fixed effects are included in all regressions. Bank country*borrower country fixed effects are included in columns (3, 4). *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

including the lender country bond market growth rate and interacting it with the lender country EPU. In both the *Volume* and *Number* regressions, the stand-alone coefficient on EPU remains positive and statistically significant. The coefficient on the interaction term enters both regressions positively, and statistically significantly in the *Volume* regression. The results indicate that banks facing high EPU increase lending more aggressively if the domestic bond market growth is high, and therefore banks face fiercer competition from the bond market. These results are consistent with the finding above with the market power interactions.

Baker et al. (2016) find that when a country's economic policy uncertainty is high, the volatility in the stock markets in that country increases. Therefore, we expect that banks that are involved in more diverse activities generating non-interest income are affected more by the economic policy uncertainty than banks with more traditional business models. In columns (5, 6), we include in the baseline the *Income Diversity* variable and its interaction with the lender country EPU. The coefficient on *Income Diversity* is negative and statistically significant in both *Volume* and *Number* regressions. The interaction variable enters both regressions positively and statistically significantly. Banks with diverse income increase cross-border lending more aggressively when domestic economic policy uncertainty is particularly high. When we include the *Income Diversity* variable and its interaction with the lender country EPU, the stand-alone coefficient on the lender country EPU becomes statistically insignificant. This indicates that the finding that banks engage in higher levels of cross-border lending in the presence of uncertainty is mainly driven by income-diverse banks (in the sub-sample for which the bank-level data is available).

Table 7
EPU and loan terms: facility level analysis.

	Spread	*Spread*	*Collateral*	*Collateral*	*Covenant*	*Covenant*	*Maturity*	*Maturity*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
EPU	0.176	4.693	0.018**	0.009	−0.038*	−0.065	1.228	1.414
	(0.07)	(1.43)	(2.59)	(0.51)	(−1.77)	(−1.19)	(1.58)	(1.42)
Spread				0.000		−0.000*		0.031***
				(0.71)		(−1.95)		(5.43)
Collateral		6.505				0.214***		8.574***
		(0.87)				(4.60)		(5.24)
Covenant		−7.160**		0.068***				−0.673*
		(−2.12)		(4.55)				(−1.74)
Maturity		0.858***		0.002***		−0.000*		
		(6.53)		(3.98)		(−1.73)		
Relationship	−10.832***	−9.041***	0.007	0.011	0.021	0.045	−0.663	−1.228***
	(−3.54)	(−3.19)	(1.08)	(1.05)	(1.36)	(1.66)	(−1.70)	(−3.12)
Loan size	−9.044***	−12.529***	0.007**	0.000	0.002	0.004	2.984***	3.577***
	(−4.67)	(−5.80)	(2.19)	(0.03)	(0.80)	(1.46)	(8.78)	(16.29)
Revolver	−55.689***	−52.098***	−0.022***	−0.022***	0.025***	0.026***	−2.895***	−0.507
	(−11.17)	(−10.40)	(−4.46)	(−3.14)	(4.96)	(4.44)	(−4.94)	(−0.79)
Senior	−434.497***	−419.218***	0.182***	0.214***	0.033***	−0.088**	−21.037***	−11.044***
	(−18.66)	(−17.49)	(5.80)	(8.72)	(3.05)	(−2.72)	(−17.07)	(−4.99)
Loan purpose	−33.871***	−31.907***	−0.072***	−0.029**	−0.030	−0.031	−3.586***	−1.881***
	(−6.87)	(−5.88)	(−4.61)	(−2.29)	(−1.26)	(−0.79)	(−5.94)	(−3.96)
CPI	−194.697	−317.898	0.236	0.485	0.126	−1.534	39.429	43.466
	(−0.60)	(−0.87)	(0.72)	(0.43)	(0.07)	(−0.50)	(0.89)	(0.74)
GDP Growth Rate	−3.170*	−1.139	−0.004*	0.004	−0.006	−0.023	0.312	−0.484
	(−2.06)	(−0.45)	(−1.79)	(0.99)	(−0.88)	(−1.48)	(1.20)	(−1.21)
10-Year Yield	4.004***	7.705**	0.003	0.001	0.016	0.004	−1.018**	−0.758
	(2.99)	(2.76)	(0.91)	(0.06)	(1.59)	(0.23)	(−2.80)	(−1.50)
Exchange rate	−0.048	0.228	−0.000	−0.001	−0.000	−0.004**	0.027	−0.053
	(−0.97)	(0.97)	(−0.15)	(−1.29)	(−1.16)	(−2.35)	(0.88)	(−1.09)
Supervisory power	−0.098	−2.666	0.007***	0.003	−0.002	−0.006	0.143	0.448**
	(−0.07)	(−1.53)	(4.89)	(0.97)	(−0.38)	(−0.41)	(0.94)	(2.82)
Capital stringency	1.113	1.983	0.004*	0.008***	−0.002	−0.010	−0.026	−0.473**
	(1.40)	(1.63)	(2.03)	(4.04)	(−0.36)	(−0.96)	(−0.12)	(−2.10)
Activity restrictions	0.226	−0.170	−0.002	0.012*	0.006**	0.015	−0.143	0.253
	(0.32)	(−0.06)	(−0.88)	(1.79)	(2.29)	(0.69)	(−0.95)	(1.43)
Observations	33,529	32,424	56,225	32,424	56,225	32,424	53,700	32,424
Adj. R^2	0.712	0.728	0.729	0.768	0.600	0.677	0.613	0.648
Borrower, quarter fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank fe	No	Yes	No	Yes	No	Yes	No	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the impact of economic policy uncertainty on the price element of the credit supply. The dependent variables are *Spread* (columns (1, 2)), *Collateral* (columns (3, 4)), *Covenant* (columns (5, 6)) and *Maturity* (columns (7, 8)). All loan terms are at the facility level. Country and loan level controls are included in all regressions. The country level controls are the macroeconomic and regulatory variables for the lender country. Variable definitions are found in Table 1 in the Online Appendix. Borrower and quarter fixed effects are included in all regressions; additionally, in columns (2, 4, 6, 8), the loan terms other than the dependent variable and bank fixed effects are also included. *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

6.4. Bank-industry-country-quarter level

So far, we aggregate cross-border lending at the bank-borrower country level and include the borrower country*quarter fixed effects, which allows us to control the time-varying credit demand in the borrower country. A potential concern is that we do not control for within-country heterogeneity in demand effects. Therefore, to address this issue, we estimate the regressions at the bank-industry-country-quarter level and control for credit demand by including the industry*country*quarter fixed effects in the regressions (we use the Fama-French 12 industry classifications (Fama and French, 1997).

We report the findings in Table 6. In both the *Volume* and *Number* regressions, the coefficients of EPU enter positively, and it is statistically significant at the 5% level in the *Volume* regression. In columns (3, 4), we further include the bilateral fixed effects between the bank country and borrower country. The coefficient of EPU remain positive and significant at the 10% level in the *Volume* regression. A 1% increase in the lender country EPU index is associated with 3.9% more cross-border lending on average issued by a bank to a borrower country's industry each quarter. The findings are consistent with the baseline, with the difference being that the magnitude of the effects are somewhat smaller (although still substantial), possibly due to controlling for demand more precisely.

6.5. Loan terms

Next, we consider the effect of lender country economic policy uncertainty on the price and non-price terms of the loan contract. Unlike the quantity element, it is not sensible to aggregate the price element to the country-quarter level. Because the price element contains several co-determined terms, aggregating loses vital information; e.g., an unsecured loan with a higher spread is not necessarily more expensive than a secured loan with a lower spread. Hence the loan terms regressions are at the facility-level. The most restrictive specification we estimate is the following:

$$Loan\,Terms_{l,i,k,t} = \beta_1 + \beta_2 * EPU_{j,t-1} + \beta_3 * F + \lambda_k + \delta_t + \gamma_i + \varepsilon_{l,i,j,k,t} \quad (4)$$

where the dependent variable, $LoanTerms_{l,\,i,\,k,\,t}$, is one of *Spread*, *Collateral*, *Covenants* or *Maturity* in loan facility *l* issued by bank *i* in country *j* to borrower *k* at time *t*. The main independent variable of interest, $EPU_{j,\,t-1}$, is the EPU of bank *i*'s country *j*. Unobserved time-invariant borrower heterogeneity is captured by borrower fixed effects, λ_k. δ_t and γ_i represent the quarter fixed effects and bank fixed effects, respectively. The regressions also include the following controls, captured by the vector *F*: the lender country macroeconomic and regulatory variables, as well as the fraction of lenders with which the borrower has a prior lending relationship (*Relationship*). Additionally, the each regression contains the other loan terms, the assumption being that all loan terms are co-determined. We estimate the equation with OLS and standard errors are double-clustered at the lender-country and quarter level.

We report the results in Table 7. For each loan term, we show two specifications. In the first column, we include the country and loan level controls, and the borrower and quarter fixed effects. In the second column, we further include the loan terms other than the dependent as controls and the bank fixed effects. In columns (1, 2), we present the *Spread* regressions. The coefficient on EPU in both columns is statistically insignificant at the conventional levels. In columns (3, 4), the dependent variable is *Collateral*. In column (3), the coefficient on EPU is positive and statistically significant at the 5% level, indicating that higher uncertainty is associated with an increased likelihood of the facility being secured by collateral. However, the statistical significance disappears in the stricter specification. In columns (5, 6), the dependent variable is *Covenants*. The coefficient on EPU is negative in both specifications, and statistically significant in column (5), suggesting less use of covenants during uncertain times. Finally, in columns (7)–(8) the dependent variable is *Maturity*, and the coefficient on EPU is positive but statistically insignificant, whether or not we include the other loan terms as controls and the bank fixed effects. Overall, we do not find evidence that cross-border loans are more expensive under high uncertainty, but we do find some tentative evidence that banks alter the structure of contracts (consistent with banks intending to reduce active monitoring).

6.6. Elections

It is possible that factors which determine policy uncertainty may simultaneously determine banks' cross-border credit supply. While we include a host of macroeconomic and regulatory controls in our regressions, there may be other (potentially unobservable) common factors, driving uncertainty and cross-border credit supply of banks. We use elections as a source of plausibly exogenous variation, which positively affects a specific aspect of economic policy uncertainty, political uncertainty, in order to identify a causal effect. We re-estimate the baseline regression (Eq. 1), replacing EPU with the *Election* dummy (defined below). Additionally, in subsequent specifications, we include interactions between the *Election* dummy and *Margin* in order to capture the effect of political uncertainty on banks' cross-border credit supply.

Our information on national elections comes from the World Bank's Database of Political Institutions (DPI) and Polity IV dataset maintained by the Center for International Development and Conflict Management at the University of Maryland. First, following Persson and Tabellini (2009), we only keep the elections held under democratic regime since political uncertainty is generated when there are institutionalized democracy features in the elections. Based on the polity2 indicator from the Polity IV dataset, we drop China from our 21 countries and keep the other 20 countries. We hand-collect the dates of the national elections in the 20 countries from 2003 to 2018. Finally, we verify from the list given by Julio and Yook (2012), that 8 countries of those 20 countries in our sample are classified as having exogenous timing of elections (constitutionally mandated). Exogenous election timing rules out the possibility that elections are correlated with the country's economic conditions.

Our analysis considers 81 national elections in 20 countries held between 2003 and 2018 (see Table 2 in the Online Appendix). Following Kim (2018), we define the political uncertainty window as the four quarters around the election, (−3q, +1q); three quarters leading up to the election quarter, and the quarter in which the election is held. For example, if an election happens in Q1 of 2012, we define the period, Q2:2011-Q1:2012, as the political uncertainty window. This window reflects the post-election uncertainty resulting from the government formation process (Diermeier and Merlo (2004)). We generate a dummy, *Election*, which equals one during the political uncertainty window and zero otherwise. We use a second variable, *Margin*, which is the difference between seat shares of the biggest government party and the biggest opposition party, as a fraction of the total number of seats. The *Margin* variable is available from 2000 to 2015 in the DPI database, and it captures how closely fought the election is; a more closely-fought election indicates higher political uncertainty.

First, we estimate the regressions at the bank-country-quarter level. We consider the sub-sample of lender countries for which the election timings are fixed by the constitution in columns (1)–(6) of Table 8. We report the baseline results in columns (1, 2). Both in the *Volume* and *Number* regressions, the coefficient on the *Election* dummy is statistically insignificant. On average, it appears that political uncertainty does not affect banks' cross-border credit supply. However, the unconditional effect may be masking that banks are only affected during periods of severe political uncertainty. In columns (3, 4) we test whether more closely contested elections had a stronger effect on cross-border credit supply, by interacting the *Election* dummy with the *Margin* variable. A narrower *Margin* indicates a more closely-fought election and a higher level of political uncertainty. Therefore, if more severe uncertainty has a stronger effect, we expect the coefficient on the interaction variable to enter the regressions negatively. Indeed in both regressions, the interaction terms enter negatively, and they are statistically significant at the 5% level. In columns (5, 6), we further include the bank*borrower country fixed effects to control for bilateral relationships; the coefficient on the interaction term between *Election* and *Margin* remain negative in both the *Volume* and *Number* regressions, and significant at the 5% level in the *Volume* regression. These findings indicate that when political uncertainty is particularly high, the effect on cross-border lending becomes positive.

In columns (7) and (8) of Table 8 we consider the sub-sample of lender countries for which the election timings are flexible. As election timings are flexible, the ruling party may call snap elections precisely when uncertainty is low. If so, elections may even represent more tranquil times, and therefore when election timings are flexible, the election period is no longer a reliable proxy for uncertainty (see also Julio and Yook (2012) and Kim (2018)). We report the baseline results in columns (7, 8). In both regressions, the *Election* dummy is negative and statistically significant. Therefore, in countries with flexible election timings, we do not find evidence

Table 8
Elections and cross-border credit supply: bank-country-quarter level analysis.

	Exogenous Timing						*Exogenous Timing*	
	Volume	*Number*	*Volume*	*Number*	*Volume*	*Number*	*Volume*	*Number*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Election	−0.001	−0.007	0.154**	0.045	0.126	0.022	−0.047***	−0.011*
	(−0.02)	(−0.53)	(2.50)	(1.67)	(1.78)	(0.75)	(−3.46)	(−1.80)
Margin*Election			−0.850**	−0.266**	−0.742**	−0.193		
			(−3.28)	(−2.94)	(−2.55)	(−1.77)		
GDP growth rate	−0.002	−0.008	0.006	−0.007	−0.004	−0.011	−0.012***	0.000
	(−0.12)	(−1.22)	(0.44)	(−1.18)	(−0.21)	(−1.60)	(−3.52)	(0.20)
CPI	−1.790	1.087	−3.214	−0.048	0.678	1.109	0.489	0.503
	(−0.31)	(0.48)	(−0.56)	(−0.02)	(0.12)	(0.63)	(0.33)	(0.45)
10-Year Yield	0.005	−0.020*	0.021	−0.011	−0.020	−0.032**	0.033	−0.007
	(0.22)	(−2.33)	(0.78)	(−1.01)	(−0.59)	(−2.87)	(1.36)	(−0.69)
Exchange rate	−0.009***	−0.002*	−0.008**	−0.001	−0.004	0.002	0.001	0.001*
	(−3.63)	(−2.02)	(−2.62)	(−1.51)	(−1.30)	(1.09)	(0.39)	(1.92)
Supervisory power	−0.013	−0.021*	−0.020	−0.024**	−0.036	−0.032**	0.004	0.004
	(−0.42)	(−2.14)	(−0.57)	(−2.56)	(−1.14)	(−3.11)	(0.36)	(0.49)
Capital stringency	−0.013	−0.025**	0.015	−0.028*	−0.019	−0.034*	0.002	−0.001
	(−0.26)	(−2.50)	(0.24)	(−2.14)	(−0.33)	(−2.27)	(0.14)	(−0.07)
Activity restrictions	0.045	0.006	0.042	0.007	0.072	0.013	0.002	0.001
	(1.53)	(0.61)	(1.27)	(0.71)	(1.89)	(0.88)	(0.05)	(0.04)
Observations	29,145	29,145	25,038	25,038	21,969	21,969	47,761	47,761
Adj. R^2	0.456	0.335	0.458	0.332	0.526	0.504	0.585	0.587
Bank fe	Yes	Yes	Yes	Yes	No	No	No	No
Bank* Borrower country fe	No	No	No	No	Yes	Yes	Yes	Yes
Borrower country*Quarter fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the impact of political uncertainty on credit supply. The dependent variables, *Volume* (dollar amount) in the odd-numbered columns, and *Number* (number of loans) in the even-numbered columns, are at the bank-country-quarter level. In columns (1–6), we only keep exogenously timed national elections in the sample. In columns (7, 8), we use the elections with endogenous timing. *Election* is a dummy variable that equals 1 if a loan was originated during lender country's political uncertainty window. In columns (3–6), *Election* is interacted with *Margin*. The country level controls are the macroeconomic and regulatory variables for the lender country. Variable definitions are found in Table 1 in the Online Appendix. Bank and borrower country*quarter fixed effects are included in all regressions. We also include the bank*borrower country fixed effects in columns (5–8). *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

Table 9
Elections and cross-sectional heterogeneity: bank-country-quarter level analysis.

	Exogenous Timing Sample with Small Margin								*Exogenous Timing Sample with Large Margin*	
	Baseline		*Lender Lerner*		*Bond Growth*		*Income Diversity*		*Baseline*	
	Volume	*Number*	*Volume*	*Number*	*Volume*	*Number*	*Volume*	*Number*	*Volume*	*Number*
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Election	0.149**	0.043*	0.417	−0.021	0.238***	0.066**	0.167	−0.080	−0.070*	−0.034*
	(3.13)	(2.33)	(1.48)	(−0.20)	(4.52)	(2.38)	(0.91)	(−1.25)	(−2.12)	(−2.32)
Election* *X*			−1.016	0.194	−1.223	−1.153	0.276	0.264***		
			(−0.98)	(0.50)	(−0.80)	(−1.40)	(1.47)	(12.56)		
X			−0.085	0.098	0.358*	0.003	−0.058	−0.095		
			(−0.15)	(0.59)	(2.20)	(0.06)	(−0.80)	(−1.92)		
GDP growth rate	0.010	−0.011	0.006	−0.006	0.005	−0.009	−0.039	−0.028	0.002	−0.008
	(0.92)	(−1.32)	(0.47)	(−0.67)	(0.30)	(−0.72)	(−0.75)	(−1.02)	(0.11)	(−1.16)
CPI	1.759	4.513*	−4.351	4.273*	−12.626*	3.492	−12.883**	−4.173	0.963	2.470
	(0.31)	(2.01)	(−0.74)	(1.95)	(−2.04)	(1.64)	(−3.46)	(−0.97)	(0.16)	(1.36)
10-Year Yield	−0.031	−0.030**	0.012	−0.002	0.065	0.010	0.045	0.028	−0.025	−0.040***
	(−0.89)	(−2.46)	(0.17)	(−0.09)	(1.19)	(0.56)	(0.36)	(0.68)	(−0.87)	(−4.20)
Exchange rate	−0.005	−0.001	0.001	−0.002	0.000	−0.003	0.023	−0.004	−0.009*	0.000
	(−1.44)	(−1.45)	(0.29)	(−1.35)	(0.02)	(−1.14)	(0.96)	(−1.03)	(−2.31)	(0.13)
Supervisory power	−0.042	−0.029**	−0.055*	−0.019	−0.224***	−0.080**	−0.465**	−0.303**	−0.033	−0.031**
	(−1.47)	(−2.42)	(−2.27)	(−1.47)	(−5.31)	(−2.67)	(−2.67)	(−2.70)	(−1.19)	(−3.07)
Capital stringency	0.000	−0.019	−0.122*	−0.037	0.027	−0.015	0.000	0.000	−0.034	−0.027
	(0.01)	(−0.92)	(−2.31)	(−1.12)	(0.58)	(−0.46)	(0.00)	(0.00)	(−0.62)	(−1.60)
Activity restrictions	0.069	0.010	0.115*	0.010	0.027	−0.001	0.015	−0.006	0.073	0.008
	(1.66)	(0.53)	(2.38)	(0.44)	(1.07)	(−0.09)	(0.26)	(−0.25)	(1.85)	(0.57)
Observations	21,409	21,409	17,463	17,463	12,216	12,216	4303	4303	23,977	23,977
Adj. R^2	0.528	0.509	0.529	0.504	0.551	0.491	0.500	0.404	0.528	0.524
Bank* Borrower country fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Borrower country*Quarter fe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank country-quarter cluster	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table shows the *conditional* impact of political uncertainty on the credit supply. The dependent variables, *Volume* (dollar amount) in the odd-numbered columns, and *Number* (number of loans) in the even-numbered columns, are at the bank-country-quarter level. We employ exogenously timed national elections with a narrow *Margin* that is smaller than 0.104 in columns (1–8). In columns (9, 10), we keep the exogenously timed national elections with a margin larger than 0.104. *Election* is a dummy variable that equals 1 if a loan was originated during lender country's political uncertainty window. In columns (3–8), we include one of the variables indicated in the column header in place of *X*. In columns (3, 4), *Election* is interacted with *Lerner Index*. In columns (5, 6), *Election* is interacted with *Bond Growth Rate*. In columns (7, 8), *Election* is interacted with *Income Diversity*. The country level controls are the macroeconomic and regulatory variables for the lender country. Variable definitions are found in Table 1 in the Supplementary Appendix. Bank*borrower country and borrower country*quarter fixed effects are included in all regressions. *t-statistics* in parentheses are calculated using standard errors clustered by bank country and quarter. * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

that election periods are associated with more cross-border lending, and the results are in line with the notion that when election timings are flexible the ruling party call elections in more tranquil times.

In order to test the cross-sectional variation, we use the subsample of national elections with a narrow margin (i.e., we drop from the baseline sample the election period whenever the variable, *Margin,* takes a value larger than 0.104, which is the 25th percentile value for this variable), as this is the sub-sample in which we expect that election-induced uncertainty is elevated. We report the results in Table 9. In columns (1, 2) we report the regressions without any interaction terms. Consistent with the findings above (the margin interaction is negative in the full sample regression in Table 8), the coefficient in both regressions are positive and statistically significant. The estimates imply that elevated political uncertainty caused by close elections boosted banks' cross-border lending. When we interact the *Election* dummy with *Lender Lerner Index* (in columns (3, 4)) and *Bond Growth Rate* (columns (5, 6)), we do not find any evidence of cross-sectional variation, as the interaction terms are statistically insignificant in these regressions. However, when we interact the *Election* dummy with *Income Diversity* (in columns (7, 8)), the interaction term enters positively in both the *Volume* and *Number* regressions, and statistically significant at the 1% level in the *Number* regression. This indicates that banks with more diverse income increase their cross-border lending, during close elections.

In columns (9) and (10), we use the subsample of lender countries for which the election timings are exogenous but the election margins are large (i.e., *Margin* takes a value larger than 0.104). We regress *Volume* and *Number* on *Election* and find negative coefficients on *Election* in both specifications. Therefore, consistent with expectations, when elections are not close enough to generate sufficient uncertainty, the results do not go through.

In Tables 3 and 4 in the Online Appendix, we re-estimate the regressions at the bank-industry-country-quarter level. As before, this specification allows for stronger identification, by controlling for credit demand at the industry-country level (as we include the industry*country*quarter fixed effects). The results are similar to the baseline: the average effect of election uncertainty on cross-border lending is statistically not different from zero, but the effect is positive for close elections held in countries with mandated election timings. The effects are strongest for banks with diverse income.

7. Conclusion

We study the relationship between economic policy uncertainty and banks' cross-border lending in the context of the international syndicated loan market. We find that when uncertainty increases, banks increase cross-border lending. The effects are especially strong for banks with diverse income. Banks migrate more aggressively if they face fiercer competition in their domestic markets. By including the time-varying borrower country fixed effects in our regressions, we control for borrower demand at the country-level. Additionally, when we estimate the regressions at the bank-industry-country-quarter level, the inclusion of the industry*country*quarter fixed effects controls for heterogeneity in demand effects across industries within each country. The use of these fixed effects imply that the results are likely to be supply-driven. Finally, using exogenously timed national elections we provide some causal evidence that banks respond to increased domestic political uncertainty by engaging in more cross-border lending, especially when elections are closely fought and hence, represent higher uncertainty.

Compared to the extant literature, which extensively documents the negative effect of uncertainty on real investment, our findings show that uncertainty affects investments in financial assets differently. Our results may be interpreted as an indirect test of the importance of the valuable option-to-delay feature in driving the adverse effect of uncertainty on investment. We study an asset class which is devoid of the valuable option-to-delay feature and show that the negative effect of uncertainty on investment disappears. A policy objective may be to prevent excessive credit outflow in prolonged periods of uncertainty. Our findings suggest that enhanced market power in the banking sector may mitigate the problem of uncertainty-induced credit migration.

Declaration of Competing Interest

None.

Appendix

Illustrative example (following the real-options approach of Campello et al. (2018)): An entrepreneur has access to a project and an initial endowment of $I - L$. The project needs investment, I, and the entrepreneur chooses whether and when to undertake it. There are three dates, $t = 0,1,2$ and she may choose to undertake the project at $t = 0$ or delay the decision to investment till $t = 1$. If the project is undertaken at $t = 0$ ($t = 1$), the investment occurs at $t = 0$ ($t = 1$), and she earns revenues at $t = 1$ and $t = 2$ ($t = 2$ only). If and when the entrepreneur chooses to invest, she borrows L from the bank and the repayment rate, R_t, is set competitively, such that the bank earns zero profit

If investment occurs at $t = 0$, the project succeeds and yields X with probability p, or fails and yields 0 with probability $1 - p$ at $t = 1$. If it succeeds, it produces X again at $t = 2$, but if it fails, it produces nothing further. If the investment decision is delayed to $t = 1$, the advantage is that the entrepreneur observes whether the project has succeeded or not at the time of investing. The disadvantage is that if it has succeeded, then the entrepreneur missed out on the $t = 1$ revenues.

Following Campello et al. (2018), we think of uncertainty as affecting the probability of the project's success, holding the mean constant (mean preserving spread). Therefore, high uncertainty periods are characterized by low p and high X, and low uncertainty periods are characterized by high p and low X, such that pX remains constant. The payoffs meet the following restrictions:

$$2pX - I > 0 \tag{5}$$

$$X - I > 0 \tag{6}$$

These restrictions ensure that it positive NPV to invest either at $t = 0$ or $t = 1$.
The entrepreneur prefers investing at $t = 0$ to investing at $t = 1$ if:

$$p((X - R_1) + X) - (I - L) > p((X - R_2) - (I - L)) \tag{7}$$

The LHS (RHS) represents the payoff from investing at $t = 0$ ($t = 1$).
The repayment rates are set competitively. If lending at $t = 0$, the bankâ€™s zero profit condition is:

$$pR_1 - L = 0 \tag{8}$$

$$\Rightarrow R_1 = \frac{L}{p} \tag{9}$$

Similarly, if lending at $t = 1$, the bank's zero profit condition is:

$$R_2 - L = 0 \tag{10}$$

$$\Rightarrow R_2 = L \tag{11}$$

Substituting, R_1 and R_2 in (7), and simplifying,

$$pX > (1 - p)I \tag{12}$$

Clearly, holding pX constant for any p, investment becomes less desirable at $t = 0$ (relative to $t = 1$), the smaller the p is. Due to the valuable option to delay, and the irreversible fixed investment costs, in high uncertainty periods (low p) the firm may choose to delay investment to $t = 1$. E.g., suppose that $pX = 10$ and $I = 15$; then the entrepreneur will invest at $t = 0$ if uncertainty is sufficiently low, $p > 0.33$, and at $t = 1$ if uncertainty is high, $p < 0.33$.

How does uncertainty affect the bank's willingness to lend? If uncertainty is high, the bank is still compensated for the low p by a higher repayment rate; it makes zero profit in expectation regardless of the level of uncertainty. In practice, banks need not adjust the interest rate but alter other aspects of the loan contract. Therefore, a bank's willingness to make the loan is not affected by uncertainty, as long as the uncertainty is priced in (either through price or non-price loan terms). In addition, if the fee-generating businesses dry up or become unprofitable in the presence of uncertainty, banks may indeed increase lending.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jcorpfin.2020.101867.

References

An, H., Chen, Y., Luo, D., Zhang, T., 2016. Political uncertainty and corporate investment: evidence from China. J. Corp. Finan. 36, 174–189.
Ashraf, B.N., Shen, Y., 2019. Economic policy uncertainty and banks' loan pricing. J. Financ. Stab. 44, 100695.
Baker, S.R., Bloom, N., Davis, S.J., 2016. Measuring economic policy uncertainty. Q. J. Econ. 131 (4), 1593–1636.
Barth, J.R., Caprio Jr., G., Levine, R., 2013. Bank regulation and supervision in 180 countries from 1999 to 2011. J. Fin. Econ. Policy 5 (2), 111–219.
Berg, T., Reisinger, M., Streitz, D., 2020a. Handling Spillover Effects in Empirical Research. Working Paper.
Berg, T., Saunders, A., Schafer, L., Steffen, S., 2020b. "Brexit" and the contraction of syndicated lending. J. Financ. Econ. forthcoming.
Berger, A.N., Guedhami, O., Kim, H.H., Li, X., 2020. Economic policy uncertainty and bank liquidity hoarding. J. Financ. Intermed., 100893 https://doi.org/10.1016/j.jfi.2020.100893 forthcoming.
Bernanke, B.S., 1983. Irreversibility, uncertainty, and cyclical investment. Q. J. Econ. 98 (1), 85–106.
Biswas, S.S., Gomez, F., Zhai, W., 2017. Who needs big banks? The real effects of bank size on outcomes of large US borrowers. J. Corp. Finan. 46, 170–185.
Bloom, N., Bond, S., Van Reenen, J., 2007. Uncertainty and investment dynamics. Rev. Econ. Stud. 74 (2), 391–415.
Bonaime, A., Gulen, H., Ion, M., 2018. Does policy uncertainty affect mergers and acquisitions? J. Financ. Econ. 129 (3), 531–558.
Bordo, M.D., Duca, J.V., Koch, C., 2016. Economic policy uncertainty and the credit channel: aggregate and bank level US evidence over several decades. J. Financ. Stab. 26, 90–106.
Bradley, D., Pantzalis, C., Yuan, X., 2016. Policy risk, corporate political strategies, and the cost of debt. J. Corp. Finan. 40, 254–275.
Caballero, R.J., 1991. On the sign of the investment-uncertainty relationship. Am. Econ. Rev. 81 (1), 279–288.
Campello, M., Cortes, G., d'Almeida, F., Kankanhalli, G., 2018. Global Effects of the Brexit Referendum: Evidence from US Corporations. Working paper.
Cao, C., Li, X., Liu, G., 2019. Political uncertainty and cross-border acquisitions. Rev. Fin. 23 (2), 439–470.
Choi, S., Furceri, D., 2019. Uncertainty and cross-border banking flows. J. Int. Money Financ. 93, 260–274.
Çolak, G., Durnev, A., Qian, Y., 2017. Political uncertainty and IPO activity: evidence from U.S. gubernatorial elections. J. Financ. Quant. Anal. 52 (6), 2523–2564.
Datta, S., Doan, T., Iskandar-Datta, M., 2019. Policy uncertainty and the maturity structure of corporate debt. J. Financ. Stab. 44, 100694.
De Haas, R., Van Horen, N., 2013. Running for the exit? International bank lending during a financial crisis. Rev. Financ. Stud. 26 (1), 244–285.
Diermeier, D., Merlo, A., 2004. An empirical investigation of coalitional bargaining procedures. J. Public Econ. 88 (3–4), 783–797.
Drobetz, W., Ghoul, S.E., Guedhami, O., Janzen, M., 2018. Policy uncertainty, investment, and the cost of capital. J. Financ. Stab. 39, 28–45.
Drucker, S., Puri, M., 2005. On the benefits of concurrent lending and underwriting. J. Financ. 60 (6), 2763–2799.

Duong, H.N., Nguyen, J.H., Nguyen, M., Rhee, S.G., 2020. Navigating through economic policy uncertainty: the role of corporate cash holdings. J. Corp. Finan. 62, 101607.
Fama, E.F., French, K.R., 1997. Industry costs of equity. J. Financ. Econ. 43 (2), 153–193.
Francis, B.B., Hasan, I., Zhu, Y., 2014. Political uncertainty and bank loan contracting. J. Empir. Financ. 29, 281–286.
Giannetti, M., Laeven, L., 2012. The flight home effect: evidence from the syndicated loan market during financial crises. J. Financ. Econ. 104 (1), 23–43.
Gulen, H., Ion, M., 2015. Policy uncertainty and corporate investment. Rev. Financ. Stud. 29 (3), 523–564.
Gungoraydinoglu, A., Çolak, G., Öztekin, A.N.D., 2017. Political environment, financial intermediation costs, and financing patterns. J. Corp. Finan. 44, 167–192.
Hill, P., Korczak, A., Korczak, P., 2019. Political uncertainty exposure of individual companies: the case of the Brexit referendum. J. Bank. Financ. 100, 58–76.
Huang, T., Wu, F., Yu, J., Zhang, B., 2015. Political risk and dividend policy: evidence from international political crises. J. Int. Bus. Stud. 46 (5), 574–595.
Im, H.J., Kang, Y., Shon, J., 2020. How does uncertainty influence target capital structure? J. Corp. Finan. 101642.
Ivashina, V., 2009. Asymmetric information effects on loan spreads. J. Financ. Econ. 92 (2), 300–319.
Jens, C.E., 2017. Political uncertainty and investment: causal evidence from U.S. gubernatorial elections. J. Financ. Econ. 124 (3), 563–579.
Julio, B., Yook, Y., 2012. Political uncertainty and corporate investment cycles. J. Financ. 67 (1), 45–83.
Kim, O., 2019. Does political uncertainty increase external financing costs? Measuring the electoral premium in syndicated lending. J. Financ. Quant. Anal. 54 (5), 2141–2178. https://doi.org/10.1017/S0022109018001382.
Klössner, S., Sekkel, R., 2014. International spillovers of policy uncertainty. Econ. Lett. 124 (3), 508–512.
Laeven, L., Levine, R., 2007. Is there a diversification discount in financial conglomerates? J. Financ. Econ. 85 (2), 331–367.
Matousek, R., Panopoulou, E., Papachristopoulou, A., 2020. Policy uncertainty and the capital shortfall of global financial firms. J. Corp. Finan. 62, 101558.
Nguyen, N.H., Phan, H.V., 2017. Policy uncertainty and mergers and acquisitions. J. Financ. Quant. Anal. 52 (2), 613–644.
Nguyen, Q., Kim, T., Papanastassiou, M., 2018. Policy uncertainty, derivatives use, and firm-level FDI. J. Int. Bus. Stud. 49 (1), 96–126.
Peek, J., Rosengren, E.S., 1997. The international transmission of financial shocks: the case of Japan. Am. Econ. Rev. 87 (4), 495–505.
Persson, T., Tabellini, G., 2009. Democratic capital: the nexus of political and economic change. Am. Econ. J. Macroecon. 1 (2), 88–126.
Petersen, M.A., 2008. Estimating standard errors in finance panel data sets: comparing approaches. Rev. Financ. Stud. 22 (1), 435–480.
Pham, A.V., 2019. Political risk and cost of equity: the mediating role of political connections. J. Corp. Finan. 56, 64–87.
Qi, Y., Roth, L., Wald, J.K., 2010. Political rights and the cost of debt. J. Financ. Econ. 95 (2), 202–226.
Stokey, N.L., 2016. Wait-and-see: investment options under policy uncertainty. Rev. Econ. Dyn. 21, 246–265.
Waisman, M., Ye, P., Zhu, Y., 2015. The effect of political uncertainty on the cost of corporate debt. J. Financ. Stab. 16, 106–117.